


A Database Publication

electron

user

Vol. 5 No. 1 October 1987 £1



**SAVE the
Micro Kid in
Witchcraft**

**TEST your power
to recall trivia in
SNAIL TRAIL**

**Cheat modes for top games
Logo programming explored
Computer jargon revealed**

UTILITIES INSIDE
Print labels from View
Create 3D wireframe
graphics. Restore
your ADPS

CRAZY RIDER

FREE
ENHANCED BBC
MASTER VERSION
• Extra Race Circuits
• Extra Game Music
• Extra Graphics
• Extra Game Features



A PROGRAMMING BREAKTHROUGH

The first Electron motor racing game to faithfully recreate the bends and chicanes of major international racetracks



Setting the Scene



Going round the bend at Misano (BBC MICRO VERSION)



Knocking off an opposing rider (BBC MICRO VERSION)



Clever Evasion programming techniques (ACORN ELECTRON VERSION)

If you can't beat them, knock them off!

Howling round the bends at Le Mans at 150 m.p.h. is a daunting experience. You'll need nerves of steel and slick reflexes to finish in the Top 6 and qualify for the next race. If, at first, you can't make the grade you can always let off steam (and gain bonus points) by bumping into the other riders and knocking them off their bikes, listen for the terrified wail as the rider is sent flying to the ground.

Each race has 60 participants — and the further you get, the tougher the competition becomes. Bonus points are awarded for a good finishing position, and your "hit-count" shown at the top of the screen records the number of other riders you have sent tumbling from their steeds.

Seven top international racetracks are featured:

- Le Mans (France)
- Anderstorp (Sweden)
- Paul Ricard (France)
- Brands Hatch (U.K.)
- Misano (Italy)
- Silverstone (U.K.)
- Nurburgring (W. Germany)

An enhanced version has been specially produced for owners of the BBC Master Series computers. Included free with all BBC Master cassettes and discs, this version features several extra race circuits, a beautiful 6-minute musical soundtrack, and a host of extra game features — making full use of the Master's extra memory and capabilities.



BBC Micro Cassette **£9.95** Acorn Electron Cassette... **£9.95**
BBC Micro 5¼" Disc **£11.95** Acorn Electron 3½" Disc. **£14.95**
BBC Master Compact 3½" Disc **£14.95**

(Compatible with the BBC B, B+ and Master Series computers).

PRIZE COMPETITION

A superb M2 Simson sports moped (illustrated above) worth £500 is the first prize in our competition.

To enter the competition, you must finish in qualifying position on the first 21 racetracks, and note down the congratulatory messages you receive. Closing Date: 31st March, 1988.

SUPERIOR SOFTWARE
Limited

ACORN SOFT

Dept. CR3, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453

Please make all cheques payable to "Superior Software Ltd".



24 HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
 - Postage and packing is free.
 - Faulty cassettes and discs will be replaced immediately.
- [This does not affect your statutory rights]

News

All the latest developments in the ever-expanding world of the Electron.

5



Hardware Projects

The second instalment in the construction of the Electron buggy.

8

Label Printer

Extend the capabilities of View with this powerful Basic utility.

11

Software

Saga of a Spy, Ziggy, Crazy Er+Bert, Puppet Man and Five Star Games are given a thorough workout.

15

Adventure Writer

The command parser is examined in Part IV of our adventure writing series.

18

ADFS Restore

We show you how to run the ADFS at E00 and still save your programs afterwards.

23

Education

Nick Outterside continues his look at the role of the Electron in education.

25

3D Graphics

We show how to draw complex rotating 3D wireframe objects on your Electron.

28

Witchcraft

Help the Micro Kid fight the evil witches in this fascinating logic puzzle.

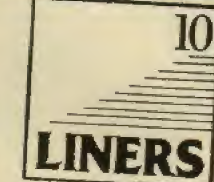
33



Adventures

More hints, tips, clues and magic potions from our resident wizard as he fights to save brave adventurers from fiendish foes.

36



10 Liners

Another selection of the pint sized programming marvels from our readers.

39

Logo

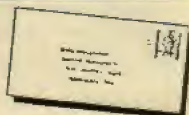
The start of a new series exploring the language of turtle graphics.

42

Arcade Corner

A selection of pokes, hints, tips and cheats modes for the top arcade favourites.

44



Micro Messages

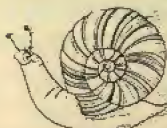
The pages you write yourselves. A selection from the hundreds of letters in our mailbox.

47

Snail Trail

Pit your wits against your Electron in this incredible test of trivial knowledge. But you'll have to be quick.

55



Jargon

At last, we can bring you the full unexpurgated translation of modern day computer-speak.

59

Bargains galore!

Don't miss our special offers on Pages 50-53.

Managing Editor
Derek Meakin
Features Editor
Roland Waddilove
Production Editor
Peter Glover

Art Editor
Heather Sheldrick
Reviews Editor
Chris Payne

Advertising Sales
John Snowden
Peter Babbage

Published by Database Publications Ltd

Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Telephone: 061-456 8835 (Editorial) 061-456 8383 (Administration) 061-456 8500 (Advertising)
Subscriptions: 061-480 0171. Telex: Gold Mailbox, 72-MAG001. Prestel: 614568383
Telex: 266871 MONREF G. Quoting Ref. 72-MAG001



37.5/5 January-June 1986

News trade distribution:
Diamond-Europe Sales and Distribution,
Unit 1, Burgess Road, Ivyhouse Lane,
Hastings, East Sussex TN35 4NR. Tel:
0424 430422.
Printed by Carlisle Web Offset.
Electron User is an independent publication.
Acorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

Subscription rates for 12 issues, post free:

£12 UK
£20 Europe & Eire
£35 Overseas

ISSN 0952-3057

© 1987 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles or listings.

Advanced Computer Products

The Advanced Plus Four (A.P.4.)

- A FULLY ACORN COMPATIBLE disc 1/2 face for the 'ELK' & Plus 1
- Accepts any standard 5 1/4" or 3 1/2" disc drive with PSU
- Supplied with 1770 DFS (as supplied on the B+ & Master series) (A.E.D. is still available for Plus 3 users at £24.15 inc.)
- Page stays at &E00, the same as Tape F S. NO LOSS OF RAM
- Will allow more tape software to be run from disc
- Access compatible BBC disc-based software. No conversion program needed
- Extra sideways ROM socket fitted as standard
- A self-contained, well finished and fully tested product
- No 'short cuts' in design, finish or components
- ROM s./ware includes format, verify, free space and utils
- Achieve greater BBC compatibility

£89.55 (+VAT)

"I can recommend it to anyone contemplating upgrading to disc".

Electron User, '86

"The AP4 should be considered the standard interface for the Electron".

Acorn User, July '86

AP4 SPECIAL PACKAGE PRICES

AP4 100 = AP4 + 5 1/4" 40 track S/S including PSU £199.00

AP4 400 = AP4 + 5 1/4" track switchable D/S including PSU £229.00

These prices include VAT and delivery

THE ADVANCED PLUS FOUR

"Disc drive compatibility at long last"

ELECTRON USER, JUNE '86



AMX MOUSE

POINTS THE WAY FOR THE ELECTRON USER

AMX MOUSE

Catch an incredible AMX MOUSE! The advanced opto-mechanical device that brings to your ELECTRON facilities once only available on more expensive computers. Now you can use ICONS, WINDOWS, AND POINTERS in your own programs.

AMX PACKAGE

Plug the MOUSE into the user port, and the EPROM into your A.P.5. The latter contains fast machine code routines for creating on-screen windows, icons and pointers. And means that the MOUSE buttons can be programmed for use with commercial software such as Wordwise and View. There are two manuals included, explaining how to operate the MOUSE and the ROM routines, which are available in both basic and machine code programs.

Included in the package are two superb programs:

AMX ART has to be seen to be believed! It's a computer-aided drawing program that's just as good for serious applications - such as the preparation of detailed architectural and engineering drawings or teachers' worksheets - as it is for having lots of family fun! And if you're artistically inclined, you'll be astonished at the quality of work you can produce and save. It makes full use of on-screen menus, pull-down menus and icons, the ideal, easy way for novices to learn and gain in confidence.

ICON DESIGNER is an invaluable program for creating and storing icons for use in your OWN programs.

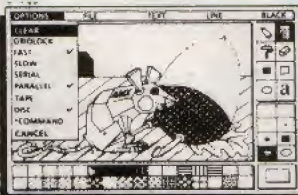
The ACP. AMX mouse package may be used on an ELECTRON fitted with a PLUS 1 & AP5. The 'ART' software is supplied on cassette but can be transferred to DISC (DFS not ADFS).

£69.95 - MOUSE PACKAGE AND AP5 £125.00

Advanced Computer Products Ltd., 6 Ava House, High Street, Chobham, Surrey. GU24 8LZ Tel: 0276 76545

THIS IS WHAT ELECTRON USER SAID ABOUT A.P.5:-

"Looking at the A.P.5, shows it to be constructed to a high standard, it looks solid and robust. The A.P.5. Interface opens up the new Electron for a whole new type of computing." E.U. Dec '86



PRES

The company responsible for marketing and distribution of Advanced Computer Products.

ANNOUNCE ADVANCED PLUS 3

A magic breakthrough in the price of disc upgrade for Electron users. AP3 provides an Acorn standard 1770 interface which plugs into the Plus one providing Acorns ADFS 3.5" disc drive and spare ROM socket. (This unit may also be upgraded to an AP4 - please contact ACP for details).

Outstanding value at only £99.00 (+ VAT).

INTRODUCTORY OFFER DISC VERSION OF SNAPPER, DRAUGHT AND REVERSI, INCLUDED

All orders will be dealt with in strict rotation, cheques and credit cards to Pres Ltd., will only be cashed on despatch.

Shipping on AP3 should commence end of September.

**PRES LTD., 6 AVA HOUSE, CHOBHAM, SURREY.
CU24 8LZ**

electron user NEWS

New at the Show

MORE innovative hardware and software for the Electron is being developed for unveiling at the 17th Electron & BBC Micro User Show to be held in November.

A number of new products have been promised for the machine, from new disc deals to music applications and utilities, though full specifications are not being released until nearer the date.

Exhibitors have been clamouring for space at the show, which runs at Royal Horticultural Hall, Westminster, London, from November 13 to 15, and almost all of the stands have now been taken.

A money-saving advance ticket order appears on page 53.

Electron gets Micro sound

A CARTRIDGE which enables the Electron to accept and play all the BBC Micro's sound commands will soon be on the market.

Project Expansions is putting the final touches to the cartridge—including giving it a name—which will sell for £39.95.

Project boss Chris Rudge said that Superior Software's Speech program had been made to work with the cartridge "after a small amount of modification".

Negotiations were now going on to see if an Electron version of the utility might be released.

The cartridge will come with demonstration music programs and spare ram.

Also on the cards from Project (0329 221109) is a utility rom which includes a very wide range of facilities, but which also has not yet reached the naming stage.

Rudge says that the rom has "a command for everybody".

It features defineable double-height characters which can be drawn on an 8x8 grid. Once complete the user is given a VDU command to call up the design. There is also a pattern and fill facility, which operates in similar fashion.

Other commands include *PLUS1 on/off; *LOCK on/off, and others for hex, binary and system specification.

It will cost £14.95.

Plus 3 upgrade

A DISC upgrade package for the Electron for less than £100 is being offered by PRES.

The distribution company has put a £99 price tag on the Advanced Plus 3, which will include a ready to roll disc system made up of an interface, filing system and 3.5in drive.

Boss John Huddleston of associated company ACP (0276 72046) described it as a major new product launch aimed at overcoming the price barrier for Electron users who wanted to upgrade to discs.

He said they had now finalised an agreement with Acorn to produce the Electron ADFS, which is run on the new product by a 1770 interface.

BEST OF BRITISH FOR THE US

A NEW transatlantic deal will see a British software house reverse recent trends by establishing a major presence in the United States.

Database Software has reached agreement on a joint venture with ShareData, pioneers of budget packages in the States and a public company valued at \$28 million.

The end result is the formation of Database Software Inc. in Phoenix, Arizona.

The new corporation aims to market the best British and

European titles through ShareData's 22,000 outlets in North America.

Database Software is part of the Database Group, the UK's leading publisher of computer magazines including Electron User.

As a software house, it first sprang to prominence in Britain in October, 1984, with the release of Mini Office—an Electron favourite.

Database Software is today recognised as one of the fastest growing companies in

its field in the UK. The last 12 months have seen its turnover increase more than five times.

Similarly, ShareData in the States has a track record second to none. It has become the pacesetter for the American industry, recording sales of more than 500,000 units in the last three months.

Michael Meakin, joint managing director of Database, flew to Arizona to complete the British-American deal.

"We have spent a long time

looking for a suitable partner in the States to make us a truly international company", he said, "and in ShareData we believe we have found the perfect answer."

"Now the search is on to find the hottest software properties in Europe and Britain to sell in America."

"It is a huge market with an insatiable thirst for good software. We intend to satisfy that demand with the help of the wealth of excellent software authors over here".

COMPETITION WENT LIKE A BOMB

A NATIONWIDE electronic mail competition offering a magnum of champagne as the star prize resulted in a giant hangover when the winner unwittingly caused the software in the central computer to crash.

When ex-San Francisco police officer Cameron (Cam) Lacey posted the 10,000th message on the MicroLink bulletin board from his office in Grimsby, all that should have happened was that he received a three litre bottle of Moët & Chandon to mark the milestone achievement.

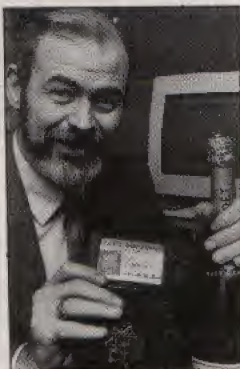
Unfortunately what no one realised at that time was that the BBS system was only designed to cope with a data field of four characters - up to and including 9,999.

So when just one additional message was received, it was as if a giant fuse had blown.

When the crash came there was consternation at MicroLink headquarters. What made matters worse was that technical chief Tim Clarkson was on holiday and all attempts by his staff to revive Britain's biggest bulletin board were unsuccessful.

After two hours of frantic transatlantic telephone calls, the American authors of the bulletin board software finally traced the problem.

They were, however, unable to make the message numbering system accept a figure larger than 9,999. All



Cameron Lacey... ex-cop cops the big prize

they could do was make room by deleting the first 5,000 messages.

In fact, the only person left with a grin on his face was Cameron Lacey.

Mind you, according to MicroLink boss Derek Meakin it should have been a sheepish one. For it seems that Cam cheated a little bit.

"He'd obviously written a program that started sending identical messages just as the number of messages on the board was approaching the 10,000 mark".

All the messages said was: "Is this the one?"

"So he ended up with the drink while we got left with the hangover".

Translation online

BRITISH computer users can now have access to what is claimed to be the biggest - and most up-to-date - multi-lingual dictionary in the world.

And it is already being viewed as a major breakthrough for groups as diverse as businessmen faced with foreign correspondence through to schoolchildren struggling with homework.

It is all part of a new service being offered by MicroLink, the UK's fastest growing electronic mail service.

Sitting at their keyboards,

all subscribers have to do is type in a word or a complete phrase and the Great European Dictionary does the rest.

Housed in an EEC sponsored mainframe computer in Luxembourg, the electronic dictionary is the result of a massive collaboration between language experts throughout the community.

The Great European Dictionary consists of more than 380,000 words and phrases in English, German, Danish, Dutch, French, Italian, Portuguese and Spanish.

THE
GALLUP
CHART

TOP 10

ELECTRON SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	AROUND THE WORLD IN 40 SCREENS <i>Superior</i>	6.95
2	2	PAPERBOY <i>Elite</i>	9.95
3	3	FOUR GREAT GAMES <i>Micro Value</i>	3.99
4	4	SUPERIOR COLLECTION VOL 2 <i>Superior</i>	9.95
5	5	CODENAME DROID <i>Superior</i>	9.95
6	6	FIVE STAR GAMES 2 <i>Beau Jolly</i>	9.95
7	7	STRYKER'S RUN <i>Superior</i>	9.95
8	8	FOOTBALL MANAGER <i>Addictive</i>	2.99
9	9	OLYMPIC SPECTACULAR <i>Alternative</i>	1.99
10	10	MICROPOWER MAGIC 2 <i>Micropower</i>	7.95

Compiled by Gallup/Microscope

Superior dominates the chart again this month holding first position with Around the World in 40 Screens in addition to the only new entry, Stryker's Run. Compilations are holding their own with three in the Top 10.

ACORN SOFT ELECTRON BONANZA

AMAZING OFFERS

VIEW ROM £29.95
(Word Processor) £14.95
VIEW SHEET ROM £29.95
(Spreadsheet) £14.95
ACORN PLUS 1 £50.95
now in stock £49.95

SCOOP PURCHASE!
ELECTRON
COMPUTERS IN
STOCK NOW
Power Supply Included
3 months warranty

CUMANA
DISC DRIVE
INTERFACE
Only
£69.95

SAVE £££'s ELECTRON PACKS

PACKAGE 1
PLUS 1 £49.95
VIEW £14.95
VIEW SHEET £14.95
~~£79.85~~

PACKAGE 2
ELECTRON
COMPUTER £59.95
PLUS 1 £49.95
VIEW ROM £14.95
~~£124.85~~

OFFER
PRICE **£69.95**

OFFER
PRICE **£99.95**

ACORN ELECTRON POWER SUPPLY ONLY £9.95

PRIMARY EDUCATION

Sentence Sequence* £6.99
Word Sequence* £6.99
Snapper £6.99
Boxer £6.99
Talk Back* £6.99
Workshop* £6.99

HOME INTEREST BUSINESS

Business Games* £6.99
Desk Diary* £6.99
Graphs & Charts* £6.99
Theatre Quiz* £14.95
Watch Your Weight* £6.99
The Complete Cocktail Maker* £6.99

*BBC Compatible

VOLTAGE TWIN JOYSTICKS

for use with Plus
One or BBC
Normally £19.95
Now only £14.95

Big Value Compilations

Beau Jolly Five Star Games
Computer Hits 1, 2, & 3
Acornsoft Hits I & II
Superior Collection Vol III
Cass
Usually £9.95 Now Only £7.95

● **ANY FIVE FOR ONLY £7.95**

MICROPOWER GAMES

Felix in the Factory £7.95
Croaker* £7.95
Bumble Bee* £7.95
Gauntlet £7.95
Killer Gorilla* £7.95
Rubble Trouble* £7.95
Electron Invaders £7.95
Felix Fruit Monsters £7.95
Chess £7.95
Danger UXB £7.95
Frenzy £7.95
Felix meets the Evil Weevils £6.95

Stock Car £6.95
Swoop* £7.95
Jelpower Jack £7.95
Cybertron Mission £7.95
Galactic Commander £7.95
Moonrider £7.95
Bandits at 3 O'clock* £6.95
Adventure £7.95
Swag £6.95
Escape from Moon Base* £7.95
Ghouls* £7.95
The Mine £7.95

*BBC Compatible

● **ANY FIVE FOR ONLY £7.95**

NEW GAMES

Classic Adventures*

Gyroscope*

Dennis through the Drinking Glass*

ROM CARTRIDGES

Logo Cartridge £59.95 £29.95

ISO Pascal Cartridge £59.95 £29.95

LISP Cartridge £29.95 £9.95

Elkman ROM £19.95 £15.95

EDUCATION SPECIALS

Linkword Spanish £14.95
Linkword Italian £14.95
I DO £12.65
Maths 'O' Level I £12.65
Maths 'O' Level II £12.65

Where? £14.95
Biology £12.65
English £12.65
Which Sait £12.65

BBC & ELECTRON AVAILABLE ANY TWO FOR £3.95

ELECTRON LANGUAGES

Lisp Cassette £9.95 £2.95
Turtle Graphics Cassette £9.95 £2.95
Forth Cassette £7.95 £2.50

Electron Games Cartridges!! Plus 1 Compatible

3 Games on one cartridge were £19.95 each

Games Cartridge I contains:

Stockcar, Cybertron Mission, Bumble Bee £14.95

Games Cartridge II

Killer Gorilla, The Mine, Positron £14.95

Games Cartridge III

Felix in the Factory, Invaders, Chess £14.95

Joystick Interface & Software only £14.95

Joystick (Quickshot II with micro-switch) only £12.95

Elite £11.95 £9.95

Plus 3 Games Disc £14.95 £9.95

Superior Collection Vol III (plus 3 disc) £14.95 £11.95

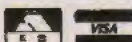
Magic Mushrooms £12.95 £2.95

Me and My Micro Book £2.95 £1.00

Advanced User Guide £9.95 £2.95

Name _____
Address _____

_____ EO



SOFTWARE BARGAINS

A division of The Micropower Group

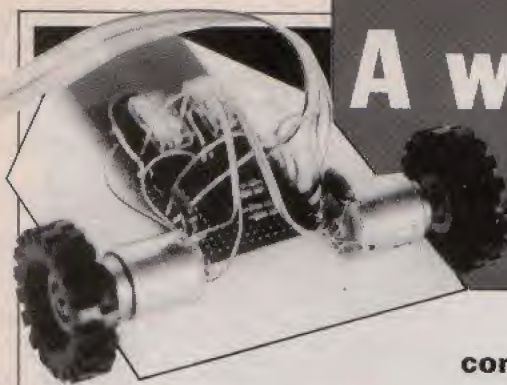
Dept EO, 8.8A Regent Street, Chapel Allerton, Leeds LS7 4PE

Tel: 0532 687735

Ansaphone out of hours

Please make cheques/P.O.'s payable to Software Bargains & add 95p P&P

October 1987 ELECTRON USER 7



A wheely good add-on

JOE PRITCHARD continues his construction of the Electron buggy

WE saw in last month's article the electronic details of the Electron buggy. Now it's time to dust off our soldering irons and begin construction.

Although we need to drive two motors on the buggy, the control circuit is quite simple. Figure 1 shows a stripboard layout for the main circuit board.

It's slightly more complicated than the simple switching circuit we built in the August 1987 issue of *Electron User*, but construction is still quite straightforward.

We'll need a piece of 0.1 inch matrix stripboard 35 rows high by at least 45

holes deep. We won't use all the rows available at the moment, but a piece of board this size will leave space to add more circuitry in future.

The first stage of the construction process is to use a spot face cutting tool or a drill bit to cut away the copper at the points marked in Figure 1.

The spot face cutter is a very useful tool, simply rest the point in a hole on the copper side of the track, and twist it a couple of times. The result is a round hole in the track.

At each point we need to totally sever the copper,

taking care not to break or go through the board. Laying the board copper side up on the workbench will help.

A cut track should look like Figure 11. Make sure there are no thin wisps of copper linking the two parts of the track. Double check each break, with a circuit tester if you have one, to ensure it's clean.

The next stage is to solder all the wire links into the board using insulated copper wire. It's a good idea to solder these in first to cut down the risk of heat damage to expensive components like the dar-

lington driver.

Take care to fit the links in the correct places, and check all of your soldered joints to make sure you don't bridge two or more tracks.

0.1 inch Veropins should be used where marked. These are metal pins that are inserted into the board and soldered in. Wires can then be twisted round the pin and soldered, as shown in Figure 111.

A pin insertion tool is quite useful for siting Veropins though they can be pushed into the board with a pair of pliers.

For all of the on board

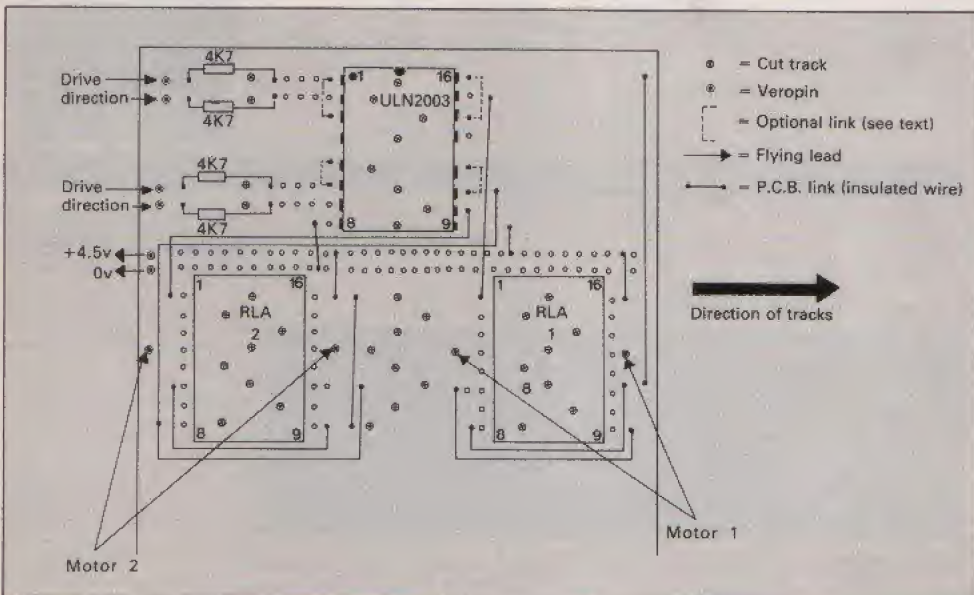


Figure 1: The stripboard layout

Hardware Projects

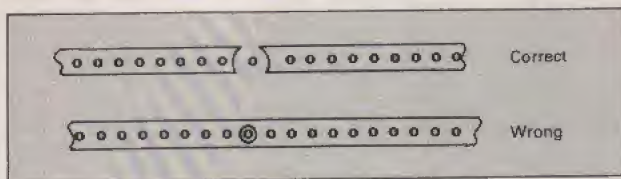


Figure II:
Making certain
that the tracks
are cut

connections, the wires can be soldered directly to the tracks, but the pins offer more strength. Eight core ribbon cable should be used for the connections to the user port and the power supply.

We now come to the first of the electronic components — the four resistors. These shouldn't cause any problems, but don't bend their leads too close to their bodies, as this can sometimes cause them to snap off. Whenever possible, bend them at right angles to the body of the component.

The relays and darlington driver chip are very delicate and should be treated with extreme care while

soldering as they can be damaged by heat.

It is, in fact, preferable to use sockets to hold these components. Three 16 pin dual in line (DIL) sockets are needed. One for the driver chip and one each for the relays which, although they only have 8 pins each will fit neatly into a 16 pin socket.

If you decide to solder the parts in direct, don't spend too long soldering the joints, and allow the component to cool down after making each one. Be especially careful not to splash solder between the pins of the darlington driver chip.

You should now have a board that's ready to connect up to the motors and

power supply for testing. However, before we do that it's a good idea to check your connections to make sure all is well.

As shown in Figure IV, connect up the motors to the relevant wires, and connect a 47nf ceramic capacitor across the terminals of each to suppress radio interference.

The 4.5V supply for the circuit can be derived from three 1.5V cells connected in series or a 4.5V torch battery.

Temporarily connect up the supply to the board. With no connections to the motor control lines, nothing should happen. Now put a finger on the darlington chip, it should be cool. If not,

check the wiring.

Next, take the direction input for motor one to 4.5V. You should hear a click as the relay closes. If not, check the wiring, especially to pins 1, 2, 15 and 16 of the darlington driver and to relay one.

If this works, connect the direction input of motor one to 0V and take the direction line of motor two to 4.5V and again listen for relay two to click.

You should be able to see the relay move. If this doesn't work, check pins 6, 7, 10 and 11 of the darlington driver chip and the connections to relay two.

Leave both direction lines connected to 0V and connect the drive lines of each motor to 4.5V. Both motors should run in the same direction. If one runs in reverse, exchange the connections to it.

We're now ready to put the whole thing together. Assembly instructions are shown in Figure V. The base

Turn to Page 10 ▶

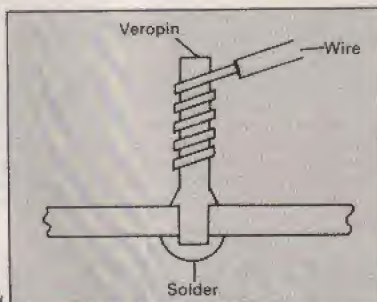


Figure III

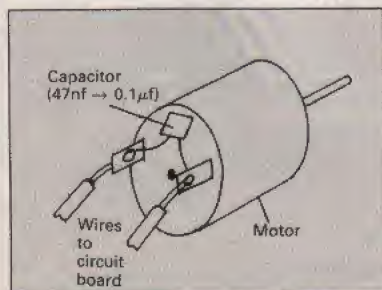


Figure IV

MOTOR PROBLEMS

I HAVE discovered that some low cost motors are not powerful enough to move the buggy. They simply don't have enough torque (turning force) to pull their own weight plus the buggy's across the floor.

To check your motors out, temporarily fix them in the correct position on the base plate and see if you can get the buggy to go forward and backward by connecting the drive inputs to 4.5V and 0V alternately.

If the buggy moves (and it might move quite quickly) your motors are fine. If it doesn't move, or judders, you may need motors with more pull. Two you can try are:

● **Technical Lego motors.** These are available in kits from toy shops and include wheels, although they can be expensive.

● **Rapid Electronics High Torque motors,** from Rapid Electronics, Hill Farm Industrial Estate, Boxted, Colchester, Essex, CO4 5RD.

Although both these motors can be used with great success, they take more current than a single darlington driver can handle. In order to protect the chip it is necessary to connect two drivers in parallel for each motor, thus halving the current that each has to cope with.

This is easily done, because in the package there are some spare drivers. On the darlington driver chip connect pin 1 to pin 3 and pin 5 to pin 6. Then, connect pin 14 to 16 and pin 11 to 12.

These connections are shown dotted in the stripboard layout diagram, Figure 1.

Hardware Projects

◀ From Page 9

plate is 1mm thick plastic card, which is available in A4 sheets from most model shops.

The wheels came from a Technical Lego set and were glued to the motor shafts with epoxy resin, though any wheels from toys or models could be used as an alternative.

The tail wheel, preventing the buggy dragging its rear end on the ground can be made from a sawn up ball point pen cap and epoxied on to the base plate, the rounded end resting on the ground. The motors can also be epoxied onto the base plate.

Double sided adhesive pads fix the circuit board between the two motors. At a later date we'll be adding extra circuits to our buggy and we'll need to make connections to this board. The

pads will hold it firmly but will allow it to be removed when necessary.

That completes construction. We'll be running the

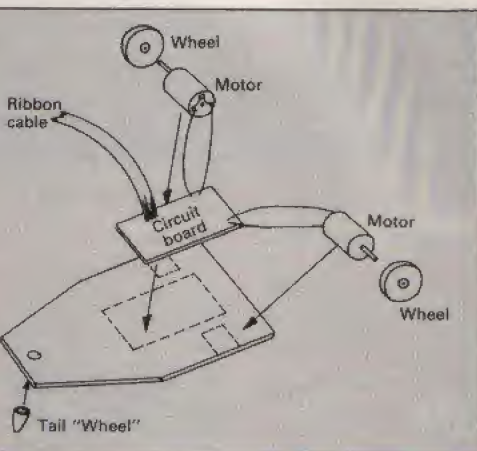


Figure V

buggy using the VIA terminal box I described in the July 1987 issue of *Electron User* so you'd better prepare it for next time.

● Next month we'll complete the buggy with some programming and introduce the VIA's timer registers.

QUAL-SOFT

THOUGHTWARE

Sports simulations

MAKING THE SOCCER MANAGEMENT GAME THE NUMBER 1 COMPUTER GAME!

Nonentity Ltd, or whatever you wish to call the team, has just been promoted to the 1st Division of the Football League. You have been appointed manager. Your squad is a typical 2nd Division side; several promising youngsters, some 1st Division 'Veterans', and your 3 close season signings that you hope will be the backbone of your 1st Division Squad. With the youngsters being enthusiastic but sometimes erratic, and your veterans reliable but fading, you will have to concern yourself with survival at first. Clever use of the transfer market will steady your side while the youngsters improve and as the veterans fade, and then provide the really classy players needed to challenge for the 1st Division Championship and the FA Cup. A place in the top six in the League, or of course one of those trophies, will put you into Europe the following season and the chance to write your name into the hall of fame. The 'double' and even a 'treble' (League, FA Cup and a European Trophy) is the ultimate accolade. Of course if you are relegated then expect the sack.

THE NEW

SOCCER SUPREMO

A SOCCER MANAGEMENT SIMULATION

TAPE 1
6 Seasons
League Division 1
The F.A. Cup

TAPE 2
European Cup
U.E.F.A. Cup
Cup Winners Cup

To the original version of SOCCER SUPREMO we've added; the F.A. Cup, the European Cup, the U.E.F.A. Cup and the European Cup Winners Cup. We've introduced multiple DATA files for the different seasons and to allow a massive transfer market of over seventy players, from World Cup stars to top scoring non-league players, we've retained the 3D, 22 man, 90 minute football match graphics, improving the graphics' layout. We've added sound, in-match injuries, named goal scorers, penalty shoot-outs (European matches), and replaced the complicated match statistics with a post match individual player assessment. We've well, lots of other small improvements.

The game is now almost three times the size of the original, using two tapes plus the multiple datafiles. But

WE'VE ADDED NOTHING TO THE COST!

The new SOCCER SUPREMO is supplied DIRECT from Qual-Soft on a same day basis. TAPE 1 + TAPE 2 + MANUAL, P&P and VAT still costs £9.95. Payment by cheque, PO or Access authorisation, made payable to Qualsoft.

QUAL-SOFT
Dept. EU,
18 Hazlemere Road
Stevenage SG2 8RX

Tel: 0438
721936



Please supply:
SOCCER
SUPREMO
for my Electron

Name: _____
Address: _____
Access No. (if applicable) _____

Utility

◀ From Page 11

```

10 REM Label printer
20 REM by Ian M. Brown
30 REM (c) Electron User.
40 :
50 MODE 6
60 PROCinit
70 REPEAT
80 PROCmenu
90 UNTIL end=TRUE
100 PROCend
110 END
120 :
130 DEF PROCinit
140 end=FALSE
150 *OPT 1,1
160 nZ=0
170 maxnZ=50
180 DIM ad$(maxnZ,10)
190 DIM adno$(maxnZ)
200 ENDPROC
210 :
220 DEF PROCmenu
230 VDU 23,1,0;0;0;0;
240 CLS
250 PRINTTAB(13,2)"LABEL P
RINTER"
260 PRINTTAB(14);nZ;" add
resses""
270 RESTORE 420
280 FOR cZ=1 TO 3
290 READ c$
300 PRINTc$;" c$
310 NEXT
320 PRINT0;" Quit"
330 PRINTTAB(13,24)"Enter
choices:";
340 REPEAT key$=GET$
350 UNTIL INSTR("1230",key
$)
360 IF key$="1" AND nZ<max
nZ PROCload
370 IF key$="2" AND nZ=0 P
ROClabel
380 IF key$="3" AND nZ=0 P
ROCdisplay
390 IF key$="0" IF FNcheck
end=TRUE
400 ENDPROC
410 :
420 DATA Load addresses,Pr
int label,Display addresses
430 :
440 DEF FNcheck
450 VDU 23,1,1;0;0;0;
460 PRINTTAB(8,24)"Confirm
choice 'key$' (Y/N): ";
470 =FNyn
480 :
490 DEF FNyn
500 REPEAT k$=GET$
510 UNTIL INSTR("YyNn",k$)
520 PRINT k$
530 =INSTR("Yy",k$)
540 :
550 DEF PROCdisplay
560 CLS
570 PRINTTAB(11,2)"Display
addresses""
580 PRINTto printer (Y/N)
?;
590 IF FNyn VDU 2
600 VDU 14
610 FOR kZ=1 TO nZ
620 PRINT"Address 'kZ'
630 FOR cZ=1 TO adnoZ(kZ)

```

Figure 11:
Including a label in a letter

```

640 PRINT ad$(kZ,cZ)
650 NEXT
660 NEXT
670 VDU 3
680 VDU 15
690 PRINTTAB(14)"Press s
pace"
700 REPEAT UNTIL GET=32
710 ENSPROC
720 :
730 DEF PROClabel
740 CLS
750 PRINTTAB(14,2)"Print l
abel""
760 IF nZ>1 PROCchoose ELS
E nZ=1
770 PRINT
780 FOR kZ=1 TO adnoZ(nZ)
790 PRINT ad$(nZ,kZ)
800 NEXT
810 PRINT"Enter print opt
ions:"
820 VDU 2,1,27,1,ASC0;"RE
M Default all settings
830 VDU 1,27,1,ASCW",1,3,
3;REM Set 'England 1' chara
cter set
840 PRINT"NLG (Y/N): ";

```

This is one of hundreds of programs
available FREE for downloading on
MicroLink
In addition to these many BBC Micro
programs in the MicroLink library will
also run on the Electron.

```

850 IF FNyn VDU 2,1,27,1,A
SC"1",1,3,3;GOTO 940
860 PRINT"Condensed (Y/N)?
";
870 IF FNyn VDU 2,1,15,3
880 PRINT"Site (Y/N)? ";
890 IF FNyn VDU 2,1,27,1,A
SCM",3 ELSE VDU 2,1,27,1,AS
CP",3
900 PRINT"Double-strike (Y
/N)? ";
910 IF FNyn VDU 2,1,27,1,A

```

```

SC"0",3
920 PRINT"Emphasized (Y/N)
? ";
930 IF FNyn VDU 2,1,27,1,A
SC"2",3
940 PRINT"Enlarged (Y/N)?
";
950 IF FNyn VDU 2,1,27,1,A
SC"W",1,1,3
960 PRINT"Margin (Y/N)? ";
970 tab=FNyn
980 PRINT"Press 'Y' to pr
int or 'N' to quit: ";
990 IF FNyn=0 ENDPROC
1000 PRINT"
1010 VDU 2
1020 PRINT
1030 FOR cZ=1 TO adnoZ(nZ)
1040 IF tab VDU 1,9
1050 PRINT ad$(nZ,cZ)
1060 NEXT
1070 PRINT"
1080 VDU 1,27,1,ASC<"
1090 VDU 3
1100 PRINTTAB(14)"Press s
pace"
1110 REPEAT UNTIL GET=32
1120 ENSPROC
1130 :
1140 DEF PROCchoose
1150 REPEAT
1160 INPUT"Which address? "
n$
1170 IF STR$(VAL("0"+n$))=
n$ nZ=VAL(n$);GOTO 1210
1180 nZ=0
1190 REPEAT mZ=nZ+1
1200 UNTIL INSTR(ad$(mZ,1),
n$) OR mZ>nZ
1210 UNTIL mZ>0 AND mZ<=nZ
1220 ENDPROC
1230 :
1240 DEF FNfound
1250 CX=0;GET #A;IF CX<>000
=FALSE
1260 CX=0;GET #A;IF CX<>043
=FALSE
1270 CX=0;GET #A;IF CX<>04F

```

```

=FALSE
1280 CX=0;GET #A;IF CX<>000
=FALSE
1290 =TRUE
1300 :
1310 DEF PROCload
1320 CLS
1330 VDU 23,1,1;0;0;0;
1340 PRINTTAB(15,2)"Load fi
le"
1350 INPUT"Name of file: "f
ile$
1360 IF file$="" file$=ADD
LIST:VDU 11,11:PRINT"Name o
f file: ADLIST"
1370 A=OPENIN(file$)
1380 REPEAT
1390 REPEAT
1400 UNTIL FNfound OR EOF #
A
1410 IF EOF #A GOTO 1550
1420 nZ=nZ+1;line=0
1430 PRINTTAB(8,10)"Address
es found "nZ
1440 SOUND 1,-1,120,2
1450 CX=0;GET #A
1460 REPEAT
1470 line=line+1
1480 ad$(nZ,line)="
1490 REPEAT
1500 IF CX>31 AND CX<127 ad
$(nZ,line)=ad$(nZ,line)+CHR$(
CX)
1510 CX=0;GET #A
1520 UNTIL CX=000
1530 UNTIL FNfound OR EOF #
A
1540 adnoZ(nZ)=line
1550 UNTIL EOF #A OR nZ=max
nZ
1560 CLOSE #A
1570 ENDPROC

```

This listing is included in
this month's cassette
tape offer. See order
form on Page 53.



Royal Horticultural Hall
Westminster, London SW1

SEE the first software, hardware and books for the Archimedes from companies like Acornsoft, Clares, Minerva, Computer Concepts, and many others.

BUT THAT'S NOT ALL!

- ★ Hardware and software galore for BBC Micro and Electron owners
- ★ Lots of bargains for the BBC Micro and Electron at rock-bottom prices
- ★ Technical advice from the experts over the whole range of Acorn machines

10am-6pm, Friday November 13
10am-6pm, Saturday November 14
10am-4pm, Sunday November 15

**Save £1
a head
with this
advance
ticket order**

Here's your personal invitation to try out the revolutionary Archimedes for yourself

Be one of the first to play Zarch, the spectacular new game that is the first to make use of the Archimedes' incredible speed to magnificent effect – the four-directional scrolling really has to be seen to be believed!

Come along and meet the author, David Braben, creator of Elite. Try your hand at the game itself... and prepare to be amazed!

All this – and much, much more – at the 17th record-breaking Electron & BBC Micro User Show.

Please supply:

- ☐ Adult tickets at £2 (save £1)..... £
☐ Under-16s tickets at £1 (save £1)..... £

- ☐ Cheque enclosed made payable to Database Publications Ltd.

- ☐ Please debit my credit card account

No.

Signed.....

Admission at door:
£3 adults, £2 under 16's

Advance ticket orders must
be received by Wednesday
November 4, 1987

Post to: Show Tickets,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Name.....

Address.....

A131

PHONE ORDERS: Ring Show Hotline: 061-480 0171
PRESTEL ORDERS: KEY *89, THEN 61456833
MICROLINK ORDERS: MAILBOX 72-MAG0015
Please quote credit card number and full address



**NOW
AVAILABLE
FOR THE
ACORN ELECTRON**

STRYKERS Run



Commander Stryker under fire in the city



Battling in the air



An action close-up



Enemy equipment (Enhanced BBC Master version)



A camouflaged battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master, Master Compact, and Acorn Electron

Stryker's Run features probably the best graphics ever seen on the BBC Micro or Acorn Electron; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees, gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgans's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play

the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Stryker's Run is one of our most successful releases ever. It has topped the BBC Micro software charts for six weeks and received several glowing reviews. "The graphics are stunning... This should be in every collection" enthused A & B Computing.

Enhanced Version for the BBC Master Series

Stryker's Run is the first release to include a specially enhanced version for the BBC Master making use of its 720K of RAM. An extra 40K of detailed graphics are provided together with additional game features and atmospheric music.

BBC Micro Cassette.....\$9.95 BBC Micro 514" Disc.....\$11.95
BBC Master Compact 3 1/2" Disc \$14.95 Acorn Electron Cassette.....\$9.95

The screen pictures show the BBC Micro version of the game.

The graphics of other versions may vary.



Dept. STR4, Regent House, Skinner Lane, Leeds LS7 4AX. Telephone: 0532 459453.

Please make all cheques payable to Superior Software Ltd.



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

Golden oldies

Program: 5 Computer Hits

Price: £6.95

Supplier: Beau-Jolly, 29a Bell Street,
Reigate, Surrey RH2 7AD.
Tel: 0737 222003

CROAKER heads this compilation tape of five golden oldies and is similar to Frogger, seen in the arcades many years ago.

Your aim is to dodge the traffic while crossing a busy road, then use floating logs and turtles as stepping stones to cross a river. Unfortunately for you, you're the only frog that can't swim.

Later, screens become more difficult as hungry crocodiles float past, and the turtles dive now and then. The graphics are well drawn, with smooth character movement. And although the sound may become a little monotonous it can be switched off.

The next game is Bagger, which is a variation on the platforms and ladders theme featuring a burglar called Roger the Dodger. With him you steal your way through 20 screens.

Most of the obstacles don't fit in with the scenario and are there simply to add spice: Conveyor belts and disappearing platforms are fine, but spaceships and railway engines are hard to explain, while giant mouths with gnashing teeth, although graphically effective, do not normally pursue even the most villainous criminal.

The sound effects are basic, with the movement not always realistic, resulting in Roger staying in the air for so long Rudolf Nureyev would be green with envy.

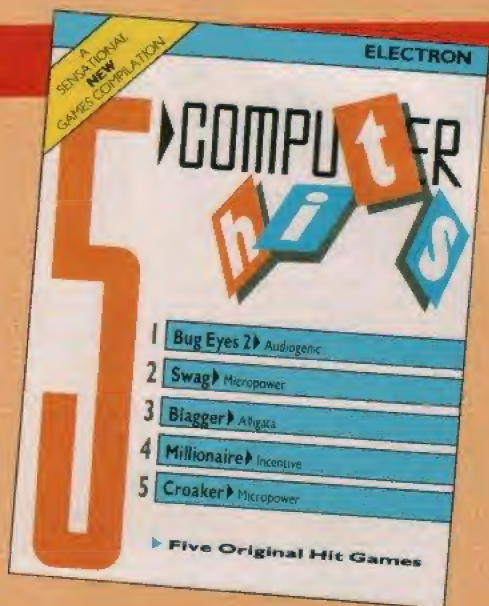
Swag is next, another game for budding burglars. You must collect £250,000 in diamonds before your opponent, all the while dodging bullets and killer droids.

The screen shows two houses where you and your opponent hide your ill-gotten gains, and also the bank where a deposit of gold will finance a further supply of bullets.

Police cars interfere with your progress, but can be stopped after a drink that refreshes parts others can't reach, and shooting at their car.

The graphics are excellent, the sound is good and the action is very fast. For my money this is the best game on the tape.

Millionaire is a simulation game where you are head of a software company and must make the necessary decisions on marketing policy, including whether to trade with Honest Harry.



The program is virtually all text, graphics being limited to a picture of the type of office you occupy, starting from a terraced house.

The questions posed are reasonably representative of the sort of decisions made in business, but too much depends on luck.

The last item is Bug Eyes 2, a multi-screen sequel to Space Agent Zelda Meets the Bug Eyes.

In the original game, Zelda took on the might of the Xxabanians and was captured. Your job is to search their flagship and find the 25 keys to release her while avoiding the nasties ranged against you.

Sound quality is good with the graphics composed of smoothly moving chunky sprites. I especially liked the way that as you exit each screen, one of Sir Clive's C5s is waiting for you.

I rate Bug Eyes 2 and Swag as the best on this compilation and if you have neither of these it becomes excellent value. The other games tend to be a little dated and I would not buy it for them alone but they are worth having to build up your collection.

Beejay



Sound.....	6
Graphics.....	7
Playability.....	7
Value.....	8
Overall.....	7

No strings attached

Program: *The Puppet Man*
Price: £3.95 (mail order only)
Supplier: Larsoft, 4 Chantry Road,
 Clifton, Bristol BS8 2QD.

GEOFF Larsen is fast becoming one of the prime adventure writers for the Electron. With the release of this, his fifth adventure, he confirms his mastery of the genre.

The Puppet Man is one of the most original and engrossing adventures I have seen for a long while, and must be Geoff's finest offering yet.

At the end of the last century there lived a puppeteer whose puppet plays were the talk of the land. In fact his puppets were so lifelike it was rumoured they were little people, made up to look like puppets.

At the midsummer fair in the village of Owlsmore the Puppet Man is due to perform, but the day before, his star marionette was stolen or mislaid.

During a dream you are visited by Mnemosyne, mother of the Greek muses. She tells you that if you can help three of her daughters, the muses of dance, comedy and poetry, they in turn will assist you in a search for the marionette.

The adventure becomes a trilogy of

inter-related plots in which you first help a ballerina, then an auguste clown and finally Pierrot.

The backdrops incorporate 19th century theatre and circus giving the whole adventure the heady atmosphere of vaudeville. The puzzles are complex, but totally logical and require careful thinking and revisiting of different scenes.

The beginning reminds me of something of a cross between Level 9's *Worm in Paradise* and Robico's *Myorem*. To be compared even in part to those two masterpieces is sure testimony to the quality of this adventure.

Later on there is a beautiful scenario involving a butcher, a baker and a candlestick maker, and a wooden tub. Another scene involves trapping a bear, while on the stage is a struggling Covent Garden escapologist.

As suggested, the adventure involves dancing, comedy, poetry and sleight of hand, and like all Larsoft adventures is totally non-violent.

The multi-use of each location and the facility to talk to the characters you meet, means Geoff has used the Quill to its utmost. The mind boggles to think of what he might achieve given machine code programming and



better text compression.

This adventure really is superb and you will be hard pressed to find a better release for the price. Larsoft is going to be a name worth watching, over the next few years.

All I can say is, buy it, you won't be disappointed.

Pendragon

Presentation	9
Atmosphere	8
Frustration Factor	9
Value for money	10
Overall	9

Spritely character

Program: *Ziggy*
Price: £7.95
Supplier: Audiogenic, 12 Chiltern
 Enterprise Centre, Station Road,
 Theale, Berkshire RG7 4AA.
 Tel: 0734 303663

ZIGGY is the unlikely new star from Audiogenic, being a rather strange thing on a spring bouncing its way round the screen.

The game is, I suspect, the first in a run of 3D arcade adventures, which up until now have never been seen on the Electron.

The screen display is laid out in a style known as oblique projection, where horizontal lines are rotated 45 degrees to the horizontal. You can see a flat board with squares marked out and your viewpoint is from above and slightly behind, looking down at an angle.

Once you've got used to the unusual perspective you can start to guide Ziggy round the board.

It all starts off in fine style, with the thing on a spring bouncing merrily

around level zero collecting assorted crystals left lying around, one in each of the four rooms. At this early stage it takes little thought to collect all four jewels.

Now you bounce on to a special square which takes you up to the next level. Complete this and move to the next. Up to level four the game is straightforward enough, but after that things start to get hectic.

Patches of sticky glue and deadly skulls start to get in the way of the little guy and he has to increase his bounce speed and distance to leap over them.

All of this excess effort drains his life force at an alarming rate and if he keeps it up for too long, it's curtains.

Ziggy is not very spectacular graphically. Although the characters are nice and chunky, the playing area is in two colour Mode 4, and even though these vary from level to level, the effect is rather drab.

The animation is a bit jerky at times and the key response can be sluggish. This is a pity, because it detracts from



what essentially is a very enjoyable game – and original too.

One feature I was pleased to see was a screen designer, so even if you can't complete the 200 rooms supplied you can at least define your own.

And just for a change, there's a natty little tune that won't drive you round the bend because you can turn it off.

Ziggy is the type of game you'll either love or hate and has got to qualify as one of the trickiest yet. So I strongly recommend that you try it before you buy it.

Julia Forester

Sound	7
Graphics	5
Playability	7
Value for money	6
Overall	6

Superb trilogy



Program: *Saga of a Spy (The Rick Hanson Trilogy)*
Price: £23.95 (cassette)
Supplier: Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.
Tel: 0443 227354

REGULAR readers will know I have long been an admirer of all Robico adventures and have played each of the Rick Hanson trilogy beyond exhaustion.

Rick Hanson, Project Thesius and Myorem, which make up the trinity, have been released individually during the past two years.

This package not only bundles the three games together with other goodies like a Robico pen, hint sheets and an adventurer's notebook but also offers a £5 saving on buying the games separately.

The accompanying documentation reveals the development of the Robico parser and adventure writing system and sets the scene for each adventure for those who are uninitiated to this super spy.

This 600 location marathon begins logically enough, with Rick Hanson -

formerly titled *The Assassin*. As Rick Hanson, agent extraordinaire, you find yourself in a disused railway station at the start of another secret mission. What it entails, you don't know, but you soon find out, unless an enemy's bullet gets you first.

The red seat cover and bull scenario has now become a classic stumbling block for nearly all who have played this game.

In Project Thesius, you have been chosen to investigate enemy development in particle beam technology which threatens world security.

You begin your mission on a sandy beach, and your first task is to dry yourself and avoid the scrutiny of an enemy helicopter. I defy anyone to solve the Witherton village maze at the first attempt.

Myorem is the third and most highly developed of the adventures, and for sheer complexity is my favourite. Tied, gagged and bound to a post in a dusty arena with a firing squad about to send you to your maker, you have only your thoughts to secure your survival.

And of all the marvellous puzzles you will be hard pressed to find one more enjoyable than the wooden hut problem.

There are a number of mazes, but each is quite individual in style and require careful mapping, though the mountains in Myorem require different technique.

Layered atmosphere and humour make offerings from most other companies pale in comparison. There are also literally dozens of exquisite chaining puzzles to think out and solve.

At £23.95 this isn't cheap, but after all, you're getting three of the best adventures available for the Electron.

Pendragon

Presentation	10
Atmosphere	10
Frustration factor	10
Value for money	8
Overall	10

Cheap and cheerful

Program: *Crazy Er*bert*
Price: £1.99
Supplier: Alternative Software, Units 3-6 Bailey Gate Industrial Estate, Pontefract, West Yorkshire, WF8 2LN.
Tel: 0977 797777

CRAZY Erbert is a cuddly looking little character who plays the hero in this 3D Pacman type game. Living in a world made up of interconnected cubes, his simple aim is to visit each one and paint its top surface a different colour.

He treats his cubes as stairways and travels diagonally up or down. Four keys are needed to steer him and these take a bit of getting used to.

At the start of the game you can select from 10 levels of difficulty and whether the movement should be fast or slow. I find the slow option is quite fast enough for me.

It's an old gripe, but what a pity there is no sound on/off option. The sound effects are nice, but many games players have a need for silence at times.

Erbert does not live alone and the

other occupants of his world are all enemies. He is persistently chased by two well-drawn large and colourful characters, Coily Snake and Boris Gorilla. If they catch him one of his three lives is lost.

He can escape from his pursuers by using the two elevators at the edge of the screen - these return him to the top block.

If Boris or Coily try to follow, they vanish for a few vital seconds. This not only gives a chance for safe movement, but also some bonus points.

Erbert can also collect a Rota Hat which allows him a limited flight. Two extra keys are required to manage the flying skills. Elevators and rota hats can only be used once.

To add to the problems, some unseen giant is rolling boulders down the cubes. If higher skill levels are chosen, some of the cubes convert themselves into vaporisers. These have an detrimental effect on Erbert's life expectancy, but they don't last too long themselves.

Also at the higher levels, Erbert can't paint the cubes in one go. He applies an undercoat on the first visit



and requires a second to apply the top coat. If you wish to score high points you can pick up Boris' banana. This causes him to loose his temper and chase you.

If you manage to recolor all the cubes you move to a new and more complex screen. There are four in all, which means that with 10 levels and two speeds, there are 80 possible combinations to choose from.

A few years ago this game would have rated as amazing value at only £1.99. Now, it is merely ordinary, though it will amuse the kids with its bright and cheerful graphics.

Rog Frost

Sound	6
Graphics	8
Playability	5
Value for money	7
Overall	6

DEMONIC DATABASES

BILL TREVELYAN introduces the command parser in Part IV of his adventure writing series

YOU are in the middle of a text adventure game and on the screen you see:

The door flies open and a huge, ape-like figure shambles in, brandishing a chainsaw, which chatters menacingly into life! What now?

and rather desperately you type something.

The command you enter determines what the next step in the game will be, what appears next on the screen, and which of the variables held in the database are to be updated.

The routine which processes your input is called a command analyser, or parser. Parsing is a term in grammar meaning the resolution of a sentence into verbs, nouns, adjectives and so on.

You could devise a system which accepted not words but numbers. However, talking to a computer in English and getting it to reply has a compelling fascination which is half the fun of playing adventure games.

Normally a command entered into an adventure is made up of one or two words, which to the player are a verb in the imperative, followed by a noun which usually denotes an object which can be picked up, dropped and so on.

By convention, directions such as North, strictly speaking adverbs, are treated as verbs.

The computer knows nothing of verbs or objects, but searches a list held in the database for a word

identical to one in the command. The index number or rank order of the matching word determines which subroutine is to be called next.

Similarly, the position of the matching word in a list of objects allows the subroutine to examine whether an object is held by the player and to update variables associated with it.

A good parser makes playing a game enjoyable. Once the player has arrived at the right idea, he should be able to frame a command the program will accept without too much trouble.

It is frustrating to have to spend hours trying combinations of words before you discover what will work.

At one point in Myorem, the walls of a tunnel threaten to close in. Obviously the strong metal fire extinguisher is meant to keep the walls apart.

It took me ages before I hit on THROW EXTINGUISHER NORTH. North is treated here as an adverb, but elsewhere as a verb.

Advanced parsing routines can handle long sentences and multiple commands - Epic Software's Wheel of Fortune is a typical example.

Although such parsers are technically admirable, they may not be as welcome as a simple routine which offers a wealth of synonyms.

Features like the CONTINUE command in The Lost Crystal are a real boon, especially when there's a lot of to-ing and fro-ing to be done.

Let's now construct a



simple command parsing routine, which will process a command made up of two words - a verb and a noun.

The keyword INPUT, corresponding to the operating system subroutine osword with A equal to zero in assembly language programming, will let you enter a complete sentence in one go.

Alternatively GET, the Basic equivalent to osrdch accepts what the player types one character at a time.

In either case the first step is to convert the command to a standard form, in which characters are all upper case, or all lower case.

To convert lower to upper case, you need to bitwise AND the byte holding an Ascii code with &DF (binary 11011111), to clear bit 5. ORing a byte with &20 (binary 00100000) does the reverse - bit 5 is set and upper case is changed to lower case.

PROCc in Program 1 uses INPUT to accept a sentence entered at the keyboard and places the string at a pre-selected address in

memory, in this case &900.

This is preferable to relying on Basic string variables as our string is stored in one of the pages in memory which otherwise wouldn't be used by a Basic program. It is also easier to convert it into standard, lower case format.

We could now do what we did in our adventure game last month - compare the command with each of the commands understood by the program in turn, to find a match.

However, it is more usual to assign an index number to the two words of the command, which allows much faster operation.

For this we need a list of verbs and a separate list of nouns in the database vocabulary to compare with what the player has entered. This is provided in the form of data.

The verbs and nouns have been truncated to three characters at most. This is to save memory and more importantly, to save time as searching a long list in Basic can be slow.

Each verb is coupled with

an index number, so synonyms, that is, words which have the same meaning, have the same number. This is convenient, but not absolutely necessary.

In an adventure you usually aren't given a list of verbs in advance, so providing a good choice for the player is important. You are told however, what an object is called the first time it turns up, so synonyms aren't mandatory.

PROC in Program 1 takes the three letter verbs in the vocabulary one at a time and uses INSTR to determine if the same string can be found at the beginning of the command - INSTR(command, verb) returns one.

If a match is found, the verb number is returned in V%. If this is zero, no match can be made.

With a noun we want to find if the string is the same as the second word of the command. As no noun in the vocabulary has less than three characters (unless you wish your player to fight an OX) this means a match with the first three characters following a space.

A space character is tacked on to the noun string before the comparison is attempted in line 420. The rank occupied in the list by the noun is returned in O% if a match exists, if not, it returns zero.

Now you have a simple command parser which accepts a two word command and returns an index number for the verb and noun you have entered.

```
10 REM Program II
20 REM Puts vocabulary in
to database
30 :
40 $LIST$=62000
50 $LIST$="n nocs as
oue agasw wuesu xup +d
+down+loa+iny+sav+loa+quie
nd+jum+lea+as+seag+get+ktak
roth+rha+clo+cut+lo+cu+n+ar
saw+r+pup+pu+lig"
60 $LIST$=42100
70 $LIST$="do+key+box+l
an+book+ev+rop+sw+bot+bot"
```

Program II

```
10 REM Program I
20 :
30 MODE 6
40 CX=6900
50 PROC
60 CLS:PRINT TAB(0,5) "Co
mand is: ";$CX
70 IF CX=0 THEN END
80 PROCV
90 PRINT TAB(10,10) "Verb
number is: ";V%
100 PROC
110 PRINT TAB(10,12) "Noun
number is: ";O%
120 END
130 :
140 DEFPROC
150 FOR IX=0 TO 67:CX?IX=
0:NEXT
160 PRINT "What next?"
170 PRINT STRINGS(9,"")
180 INPUT " - ";$CX
190 LEN=LEN($CX):IF LEN<
1 OR LEN>43? THEN VDU:GOTO
160
200 REM Convert to lower c
```

Program I

This works well, but it does have some snags. The program won't accept single letter commands such as N for north, which is something players of adventure games take for granted. It is therefore more usual to split the command into separate words, and match them with lists stored in the database.

In PROC, the command is

```
ase
210 FOR IX=0 TO LEN: IF C
X?IX=64 AND CX?IX<91 THEN CX
?IX=CX?IX OR 620
220 NEXT
230 ENDPROC
240 :
250 DEFPROC
260 RESTORE 5000
270 READ N%
280 IX=0:REPEAT
290 IX=IX+1
300 READ V%,V%$
310 IF INSTR($CX,V%$)=1 UN
TIL TRUE:ENDPROC
320 UNTIL IX=N%
330 V%$=
340 ENDPROC
350 :
360 DEFPROC
370 RESTORE 5100
380 READ N%
390 OX=0:REPEAT
400 OX=OX+1
410 READ O%$
420 O%$=" "+O%$
```

converted, if necessary, to lower case, and stored in memory. The following steps assume a space character in the string occurs only between words.

The INPUT command strips off any surplus spaces at the beginning of the string, but the player may have entered a few accidentally at the end so these are stripped also.

```
430 IF INSTR($CX,O%$)>0 UN
TIL TRUE:ENDPROC
440 UNTIL OX=N%
450 OX=0
460 ENDPROC
470 :
490 REM Vocabulary
5000 DATA 30:REM Total num
ber of verbs
5010 DATA 1,nor,2,sou,3,ea
s,4,ves,5,up,6,down
5020 DATA 7,loo,8,inv,9,sav
,10,loa,11,qui,12,end
5030 DATA 12,jum,13,lea,14,
sea,15,get,16,tak
5040 DATA 16,dro,17,thr,18,
ope,19,clo,20,cut
5050 DATA 21,loc,22,unl,23,
rea,24,wri,25,pus,26,pul,27,
lig
5060 :
5100 DATA 10:REM Total num
ber of objects
5110 DATA doo,key,box,law,b
oo,lev,rop,sw,bot,bot
```

If there isn't a space in the command, it's a single word so is stored at a predetermined location in memory. The procedure then ends.

If there is a space, the first word is made up of the characters between the start of the command string and the space. The word is stored and the part of the

Turn to Page 21 ▶

```
10 REM Program III
20 REM Uses INPUT to isol
ate each word of command
30 :
40 MODE 6
50 CX=6900:$LIST$=82000:O
LIST$=$LIST$+8100
60 :
70 PROC
80 CLS
90 IX=0:REPEAT
100 $C$=CX+64+16+1X
110 IF $C$=0? PRINT TAB(1
3,5+2+1X) STAB(IX+1); " "
120 IX=IX+1:UNTIL $C$=
130 $X$=LEFT($C$(CX+640),3)
140 IF LEN$<3 $X$="X":G
OTO 140
150 PROCV:PRINT TAB(5,20)
Verb is "<$X$>" number "<V%
160 $X$=LEFT($C$(CX+640),3)
170 PROC:IF OX=6FF PRINT
TAB(5,21) "No noun/object" E
LSE PRINT TAB(5,21) "Noun is
<";$Y$>" number "<O%
180 END
190 :
200 DEFPROC
210 FOR IX=0 TO 67:CX?IX=
0:NEXT
220 PRINT "What next?"
230 PRINT STRINGS(9,"")
240 INPUT " - ";$CX
250 LEN=LEN($CX):IF LEN<
1 OR LEN>43? THEN VDU:GOTO
220
260 REM Convert to lower c
ase
270 FOR IX=0 TO LEN: IF C
X?IX=64 AND CX?IX<91 THEN CX
?IX=CX?IX OR 620
280 NEXT
290 REM Remove trailing sp
aces from command string
300 IF RIGHT($CX,1)="" T
HEN $CX=LEFT($CX,LEN($CX)-1):
GOTO 300
310 JX=0:REPEAT
320 REM Remove leading spa
ces from remaining part of s
tring
330 IF LEFT($CX,1)="" TH
EN $CX=RIGHT($CX,LEN($CX)-1):
GOTO 330
340 JX=INSTR($CX," ")
350 WJ=CX+640+16+JX
```

Program III

```
360 REM If there isn't a s
pace, then word = entire str
ing
370 IF IX=0 THEN $WJ=$CX:G
OTO 420
380 REM Otherwise word = p
art of string to left of fir
st space
390 $WJ=LEFT($CX,IX-1):$C
X=RIGHT($CX,LEN($CX)-IX)
400 JX=JX+1
410 REM Isolate the rest o
f the string and repeat rou
tine
420 UNTIL IX=0
430 ENDPROC
440 :
450 DEFPROC
460 VJ=(INSTR($LIST$,1X)+
3) DIV 4
470 ENDPROC
480 :
490 DEFPROC
500 IF $Y$="" THEN OX=6FF:E
NDPROC
510 OX=(INSTR($LIST$,Y$)+
3) DIV 4
520 ENDPROC
```


TEL: JACQUI
0625 528885

21st.

ACCESSHOTLINE
SAMEDAY SERVICE
(BBC VERSIONS AVAILABLE)

PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE ELECTRON

NEW	SOFTWARE	NEW	NEW	NEW	NEW	NEW	NEW
CRAZY RIDER Cass 19.45 Plus 12.95		SUPERIOR'S PLAY IT AGAIN SAM 4 GAMES Citadel, Thrust, Stykero Run and Ravenskill Cass 18.25 Plus 3 Disc 12.95 (Available 1st week Oct.)		THIS MONTH'S SPECIALS SMASH & GRAB ONLY £4.95 STAIRWAY TO HELL ONLY £7.95 FRANKENSTEIN 2000 ONLY £4.95 QUICK THINKING PLUS ONLY £4.95		TYNEDISA Micro Value Gold Jai Boham Text - Jet Set Willy Cass only £3.95	
SUPERIOR'S THE PALACE OF MAJ (Citadel II) Cass £4.45 Plus 12.95		NEW HEDSONS NEW EVENING STAR (Rainbow Scan Train) Simulation Cass 18.45		MICROPOWER'S POWERPACK 3 Cassettes Cracker, The Mine, Franny		MIRRORSOFT'S SPITFIRE 40 (Simulation) Cass £8.45	
OUR PRICE		OUR PRICE		OUR PRICE		OUR PRICE	

A & F	Chula Egg	3.90
	Cylon Attack	3.90
ACORN SOFT	Elite	11.65
	Fort	6.95
	Lap	8.95
	Boxer	1.25
	Business Games	2.99
	Card Diary	2.99
	Snapper	2.99
	New Rom (Cart)	14.95
	Viewwheel Rom (Cart)	64.80
	Hopper Rom (Cart)	8.95
	ISO Pascal Rom (Cart)	64.80
ACORN LINKWORD	Italian	8.95
	Spanish	8.95
ADDITIVE GAMES	Football Manager	7.95
ATARISOFT	Rabotron	4.95
ATLANTIS SOFTWARE	League Challenge	2.99
BLUE RIBBON	Nightmare Maze	1.90
	Castle Assault	1.90
	Astro Plumber	1.90
	Diamond Mine	1.90
	Diamond Mine II	1.90
	Dork	1.90
	Beau Jolly	1.90
	Computer Hits I	8.45
	Computer Hits II	8.45
	Five Star Games	8.45
	Five Star Games II	8.45
BUGBYTE	Twin Kingdom Valley	2.90
	Starforce 7	2.90
	Tennis	2.90
	Crickit	2.95
	Ice Aid	2.95
	Savage Pond	2.95
	Skyhawk	2.90
	Ice Hockey	2.90
	Hunk Dory	2.90
	Piran B	2.90
	Dunjuz	2.90
	Squeakalot	2.90
	Templeton	2.90
BRITANNA	Play Your Cards Right	6.95
COMSOFT	Serpents Lair	3.95
	Playboy	3.95
	S.A.S. Commando	3.95
	C.O.S.	3.95
	Steve Davis Smoker	7.45
	Birdie Barrage	6.95
	Colossus Chess IV	6.45
	Brian Clough's Fortune	12.95
DSOFT	747 Flight Sim	6.95
	Phantom Combat	8.45
DATABASE	Mini Office	4.95

Micro Olympia	4.95
Magic Sword	5.45
French on the Run	8.95
DURELL MARTECH	
Comball Lynx	7.95
Gourmet's Castle	8.95
Tarzan	8.45
ELITE	
Paperboy	8.35
EPIC SOFTWARE	
The Lost Constellation	10.95
The Wheel of Fortune	7.45
Castle Frankenstein	5.95
The Queen of the Holy Grail	5.95
Kingdom of Klein	5.95
FIREBIRD	
Star Driver	2.95
GILSOFT	
The Gull	15.45
GOLEM LTD	
Education I	6.50
Education II	6.50
Fun with Words	6.50
Fun with Numbers	6.50
Jigsaw	6.50
GREMLIN GRAPHICS	
Footballer of the Year	8.45
HEWSON	
Heathrow A.T.C.	6.95
ASL SOFTWARE	
Bug Eyes II	6.95
Frankenstein 2000	5.95
Caveamen Capers	6.50
Psycastra	6.50
The Last of the Free	6.50
Electron Power Pack	6.75
Thunderstruck	6.95
Sphere of Destiny	6.75
Omega Orb	6.75
Graham Goodie Text Cricket	6.75
Ziggy	6.75
IMAGINE	
Yie Ar Kung Fu	7.95
Mike	7.45
Yie Ar Kung Fu II	7.45
INCENTIVE	
Conzition	5.00
Ket Trilogy	8.45
Adventure Creator	13.25
Loony Loco	4.95
Ring of Time	4.50
KANSAS CITY	
KOSMOS SOFTWARE	
Frank Master A or B	7.95
German Master A or B	7.95
Spanish Tutor A or B	7.95
Italian A or B	7.95
Answer Back Jun. or Sen.	6.95
New Answer Back Sport	6.95
Identity Empire	6.95
FACTFILE SERIES	
(Used with Answer Back Series)	
Arithmetic (6-11 yrs)	4.25
Spelling (8-12 yrs)	4.25
Natural History (10+)	4.25
English Words (12+)	4.25
First Aid (12+)	4.25
General Science (14+)	4.25
Know England (12+)	4.25
Know Scotland (12+)	4.25

OUR PRICE	
Supersport (14+)	4.25
20th Century History (12+)	4.25
Association Football (14+)	4.25
L.C.L.	
Micro French (0 Level)	21.50
Micro Maths (24 Prog 12 Level)	21.50
Micro English (24 Prog 12 Level)	21.50
Mega Maths (K Level)	21.50
LARSOFT	
Puppet Man	3.85
The Rising of Salandra	4.55
Waywood	4.55
The Nine Dancers	3.85
LOGOTRON	
XOR	8.45
MELBOURNE HOUSE	
Way of Exploding Fish	8.95
Dorothy Gawkers	7.75
MICROPOWER	
Micro Power Magic II	6.95
Micro Power Magic	6.50
Jet Power Jack	3.95
Packtron	3.95
Swag	3.95
Gaurmllet	3.95
Chess	3.95
Killer Gorilla	3.95
U.B.S.	3.95
Felix And Weavie	3.95
Felix In Factory	3.95
Felix Fruit Monsters	3.95
Stock Car	3.95
Rubble Trouble	3.95
Bumble Bee	3.95
MIRRORSOFT	
Nurse Strike Force	8.45
First Street	7.95
Here/There with Mr Men	6.95
Quick Thinking Plus	5.95
PEAKSOFT	
The Boss	6.95
ROBICO SOFTWARE	
Kirk Hanson	8.45
Project Thecus	8.45
Myomart	8.45
Enlithir (7.5/25) Disc	16.45
Note the above disc-AP4 IF only	
The Hunt	7.95
Village of Lost Souls	7.95
SHARDS	
Operation Safari	8.95
Woody End	8.95
SOFTWARE INVASION	
3D Bomb Alley	3.95
Gunsmoke	3.95
Blitzkrieg	3.95
Super Pool	3.95
Voter	3.95
Straway to Hall	3.95
Chupatrust	3.95
SOFTWARE PROJECTS	
Project Graphics	5.95
SQUIRESOFT	
Supergolf	6.50
Tralfalar	7.50
Castle	10.85
VAT Case	13.65
Building Soc. Care	8.95
Investment Care	12.95
T.V. Director	11.65
Squid Nuts Pack	7.95

ACORN SOFT AND SUPERIOR SOFTWARE	Smash and Grab	6.95
	Overdrive	6.50
	Rapton	7.95
	Death Star	7.95
	Rapton 2	7.95
	Citadel	7.95
	Karate Combat	7.45
	Thrust	6.75
	Galaxia	8.45
	Ravenskill	8.45
	Rapton 3	8.45
	Acornsoft Hills Vol	8.45
	Acornsoft Hills Vol II	8.45
	Superior Hills Vol III	8.45
	Superior Hills III Plus 30	12.95
	Around World 40 Screens	5.95
	Stykero Run	8.45
	Code Name Droid	8.45
TYNEDISA	TYNEDISA	8.45
	Spy vs Spy	6.45
	Onbridge	6.75
	Phantom	6.75
	Microvision	3.49
	The Spy K.O.	6.75
	Futuristik	6.75
	Jet Set Willie II	6.75
	Goal	6.75
	Commonwealth Games	6.50
	US Drag Racing	5.95
	Jet Set Willy	6.50
	Commonwealth Games	6.50
	Superior Starter Pack I	8.50
	Ann Boham Text	5.50
	Rig Attack	6.90
	Winter Games	6.50
	Monetrap	6.50
	Five-A-Side Soccer	3.95
	Peg Leg	3.95
	Bouncing Bomb	3.95
	Wet Zone	3.95
	Stratobomber	3.95
	Catapult	3.95
	Hypervise	3.95
	Super Hangman	3.95
	30 Maze	3.95
	U.K. P.M.	3.95
	Invader (I.J.K.)	3.95
	Boro the Brave	3.95
	Cylon Attack	3.95
	Trick It	3.95
	Space Caverns	3.95
U.S. GOLD	Impossible Mission	7.65
	Crystal Castle	6.95
	Rabot Panel (text ad)	6.95
	Kayleth	6.95

UTILITIES AND HARDWARE SECTION

ACORN COMPUTERS	Electron Power Supply	14.95
ADVANCED COMPUTER	PRODUCTS	
	A Quantum Meg Ram	75.95
	Advanced Battery Ram	31.95
	Advanced Control Panel	32.20

UTILITIES AND HARDWARE SECTION CONTINUED	Advanced Disc Toolkit	32.20
	Advanced Electron D.T. 6	36.95
	A.S. Manager	13.65
	A. Electron D.F.S. Eee	18.65
	Advanced Rom Aid	13.65
	A.S. Ram	27.90
	Advanced Disc Inv.	26.55
	A.P.A.	75.98
	A.P.S.	62.50
	Plus I	47.95
	AMS Mouse	65.95
	Mouse Package + APS	120.00
FIRST BYTE	Quickshot Joystick & P-ace	27.99
	Quickshot II	9.99
	Joystick Interface	18.25
	Printer Interface	118.25
	Super Smooth Power Supply + 2yr guarantee + on/off switch	20.45
	P.M.S.	
COMPRESS	BLOOPER	85.00
	Rombox +	61.95
	Joystick Interface	18.65
	Electron Expansion 2.0	10.65
	Storator II	27.25
	Storator	13.95
	Starman	18.65
	Stargraph	19.95
	Starword	31.75
	Standard Durnine	19.95
	Printer Rom	18.65
	Plus 1 Rom Upgrade	10.95
	16K Sideways Ram	27.95
	Trek	15.95
	123's or TCU or T24	22.95
	T25D or T25EDFS	22.95
	Master Ram Board	50.95
	Turbo Driver	27.95
	Rom Cartridge	11.65
	S.E.D.S.	70.95
VINE MICROS	Addcomm	28.00
PLUS 3 DISCS		
ACORN SOFTS	Database	18.65
	BLUE RIBBON	
	Carton Disc I	8.95
	C.D.S.	
	Steve Davis	8.95
	Birdie Barrage	8.95
KOSMOS SOFTWARE	French A+B	18.65
	German A+B	18.65
	Italian A+B	18.65
	Spanish A+B	18.65
	Ans. Back Sen.	11.65
	Ans. Back Jun.	11.65
	Ans. Back Sport	11.65
	Any Facile	7.45
SUPERIOR SOFTWARE	Superior Hits II	12.95
	Code Name Droid	12.95

EDUCATIONAL & GOVERNMENT ORDERS WELCOME
ALL PRICES ARE INCLUSIVE OF V.A.T. AND CARRIAGE
OVERSEAS ORDERS PLEASE ADD £1.00 PER UNIT. INCLUDES INSURANCE

BOX OF TEN C20 COMPUTER CASSETTES £4.99 inc VAT & P&P

Please send me: Cass ☐ Plus 3 Disc ☐

1. £
2. £
3. £
4. £

Please make cheques payable to:
21st Software Ltd
Access No

Cardholder's name

Send Order to:
21st Software LTD. Dept EU
15 Bridgefield Avenue,
Wiltshire SK2 2US
Tel: Wiltshire (0625) 320885

Name

Address

Post Code

Tel. No

◀ From Page 19

string to the right of the space becomes the new command string. The routine is repeated until the truncated command is reduced to one word.

To test this procedure we need a vocabulary. This time the lists both consist of a single string consisting of a number of three letter groups followed by a separator, an asterisk in this case.

The triads are the first three letters of a word, nor for NORTH, for instance or shorter groups padded out with spaces " " for SOUTH.

CHAIN Program II to put the verb and noun lists into memory, then CHAIN Program III. You can enter any number of words as long as you don't exceed 64 characters. These will be separated and printed one below the other.

The first word is taken as the verb and is given an index number, and the second as the noun or object. Note that synonyms do not have the same number. It is interesting to alter the vocabulary to four letters, or two and see the effect on the response time.

Instead of INPUT we can use GET as in Program IV. PROCc prompts the player with "What next?" and calls PROCa.

The characters entered are converted to upper case if necessary. Successive letters are joined together to make a word of pre-determined length, three in this case. If this is exceeded, what the player types still appears on the screen, but they don't add to the length of the string stored in memory.

As soon as a space or carriage return is entered, the procedure is terminated. If a space has been typed in, PROCa is again called and a second word isolated.

Lines 5000 onwards form a vocabulary constructed from data. In the verb matching procedure PROCv, a match occurs when the first, first two, or all three

```

10 REM Program IV
20 REM Uses Basic's GET
30 :
40 IX=0 :REM Counts number of turns
50 CLS
60 PROCc
70 :
80 PROCv
90 PRINT TAB(12,13)"I. ";
XS;
100 IF VX=0 PRINT "not on list" ELSE PRINT "number ";V
X
110 :
120 PROCc
130 PRINT TAB(12,13)"2. ";
140 IF YS=0 PRINT"n1":GOTO 160
150 PRINT YS;:IF OX=0 PRINT "not on list" ELSE PRINT "number ";OX
160 END
170 :
180 DEFPROCc
190 IX=IX+1
200 PRINT "What next?"
210 PRINT STRING$(9," ")
220 PRINT " - ";
230 :
240 PROCa
250 XS=YS:IF XS=0 THEN 20
260 IF GX=13 THEN YS="":GOTO 290
270 PRINT " ";
280 PROCa
290 PRINT
300 ENDPROC
310 :
320 DEFPROCc
330 IX=0:YS=""
340 REPEAT
350 IX=IX+1
360 GX=GET
370 IF GX=13 OR GX=32 THEN
UNTIL TRUE:ENDPROC
380 :
390 PRINT CHR$(GX);
400 REM Convert lower to upper case
410 IF GX=96 AND GX<123 GX=GX AND 80F
420 REM Store only first 3 chars
430 IF IX>3 THEN 450
440 YS=YS+CHR$(GX)
450 UNTIL FALSE
460 ENDPROC
490 :
500 DEFPROCv
510 RESTORE 5000:READ N1
520 FOR IX=1 TO N1
530 READ VS,VX
540 IF INSTR(VS,XS)=1 THEN
N1=NX:GOTO 560
550 VX=0
560 NEXT
570 ENDPROC
580 :
590 DEFPROCc
600 IF YS=0 THEN OX=0:FF:E
NOPROC
610 RESTORE 5100:READ N1
620 FOR IX=1 TO N1
630 READ OX,OX
640 IF OX=YS THEN IX=N1:GOTO 660
650 OX=0
660 NEXT
670 ENDPROC
680 :
690 DATA 38
700 DATA NOR,1,SOU,2,EAS,3,WES,4,UP,5,BOW,6,SAB,7,INV,8,SAV,9,LOA,10,RUL,11,END,11,800 DATA JUM,12,LEA,12,EXA,13,SEA,14,GET,15,TAK,15,500 DATA DRO,16,THR,17,OPE,18,CLO,19,CUT,20,500 DATA LOC,21,UWL,22,REA,23,WRI,24,PUS,25,PUL,26,LIG,27,5000 :
5100 DATA 18
5200 DATA DOO,1,KEY,2,BOX,3,LAR,4,BOD,5,LEV,6,ROP,7,SWO,8,BOT,9,BOT,10

```

Program IV

characters of the first word of the command are identical with those of an item in the list. So N, NO, NOR and even NORT and NORTH, all return with V% equal to one.

This allows single letter commands for the most common verbs, but note that the number returned is the first item to have the same initial letter, so D is taken as DOWN and not DROP.

In the case of nouns PROCc requires a three letter match so you can use G BOX but not GET B.

With a selection from these routines you should be able to construct a satisfactory two word command analyser, made user-friendly with comments like "Please try another verb", "You can't do that", and so on.

Now what do you do with the index numbers for verb and object your program has given you?

The object number O% is used by subroutines to extract the appropriate item

from a list of names of objects like "A short sword", a list of longer descriptions like "A sword with a jewel encrusted handle and an inscription carved on the blade", and especially a list giving the current location number of each object.

The verb number is generally the basis for selecting the subroutine which is going to execute the next step in the game.

Suppose verb one is N, verb two NORTH, verb three S, verb four SOUTH and so on, then after V% and O% have been found for the command which has been entered:

```

100 ON VX GOSUB 1100,1100,
1250,1250 ELSE GOSUB 1000

```

will direct control to a subroutine starting at line 1100 if the verb was N or NORTH, and to one at line 1250 if it was S or SOUTH.

The double entry isn't required if synonyms like N and NORTH have been allotted the same index number. At line 1000 would

be something like:

```

1000 PRINT "You can't do that!":RETURN

```

to deal with cases where no match can be found.

You may prefer to use procedures rather than subroutines. This can be done with:

```

500 AX=1000
510 GOSUB (AX+10*VX)

```

which will select from:

```

1000 PROCno_match:RETURN
1010 :
1020 PROCnorth:RETURN

```

the blank lines only being necessary if synonyms like N and NORTH don't have the same index number. If the program has to be renumbered during development, the value of A% may have to be adjusted.

A more unusual method of selecting subroutines is illustrated by Program V. You can't call procedures with a general statement like:

```

250 nae$="north":PROCname$

```

Turn to Page 22 ▶

Programming

◀ From Page 21

but you can do this with functions:

```
250 name$="north":FX=EVAL(
  "FN"+name$)
```

will call FNnorth which will result in F% being given a definite value. What's the point of that? you may ask. Suppose a function is defined as:

```
1000 DEF FNnorth
1010 PRINT "You go north,"
1100 =0
```

Then $F\% = FNnorth$ will make $F\%$ zero but the important point is that before doing so all the statements in lines 1010-1090 will be executed.

If these were a routine for drawing a circle, a circle would be drawn. Calling the function is only a subterfuge for getting the routine performed.

```
10 REM Program V
20 MODE 6
30 ON ERROR IF ERR=29 THE
N 50 ELSE CLS:END
40 GOTO 90
50 CLS:PRINT TAB(0,2);CHR
57;"Verb not on list!"
60 :
90 REPEAT
100 PRINT TAB(0,4);"Enter
command (verb in lower case)
"
110 PRINT TAB(0,7);SPC(10)
120 INPUT TAB(0,7)" -> 'x
$
130 x$=LEFT$(x$,3)
200 FX=EVAL("FN"+x$)
210 :
220 UNTIL FX=6FF
230 CLS: PRINT TAB(15,12)"
E N 0"
400 END
490 :
500 DEF Fknor
510 PROCprint("North routi
ne")
520 =1
530 :
540 DEF FNqui
550 PROCprint("Do you real
ly want to quit (Y/N)?")
560 GS=GET$:IF GS<>"Y" AND
64<>"Y"=0
570 = 6FF
580 :
1000 DEFPROCprint(a$)
1010 COLOUR0:COLOUR129
1020 xpos=(40-LENa$) DIV 2
1030 PRINT TAB(xpos,20);a$
1040 COLOUR1:COLOUR128
1050 ENDPROC
```

Program V

In Program V, as a demonstration of the power of this technique, you are asked to enter a verb. The program will only respond to north) or quit) but you can insert as many functions as you like.

Line 200 directs control to the appropriate function, which returns the value of a flag variable $F\%$ which

serves as a move flag or to signal that the main loop is to be terminated.

In a sense this is a sophisticated version of our game in the September 1987 issue of *Electron User*, as all functions are interrogated in turn to see if a match with the command can be found.

Note that no index number has to be assigned

to the verb, but any object still has to be given one.

The error trap in line 30 stops No such FN/PROC from crashing the program when no function can be found to match the command verb. The method has a snag: You can't have synonyms without destroying its chief virtue simplicity.

JOYSTICKS—THE COMPLETE SOLUTION

DELTA 38 SINGLE-BBC B or ELECTRON PLUS 1 £12.95

A single joystick that in some ways can act as two. The custom made special 'low noise' potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.

DELTA 38 TWIN-BBC B or ELECTRON PLUS 1 £19.95

A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action spring to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 35 SINGLE-MASTER COMPACT or ELECTRON FIRST BYTE INTERFACE £12.95

The same light, hand-held, fast, light action of a 38 but fitted with switches for use with a switched joystick interface, such as a First Byte.

FIRST BYTE INTERFACE £19.95

PLUS 1 Interface £49.95

SPECIAL OFFERS

Buy a DELTA 35 and a FIRST BYTE INTERFACE together for £29.95

Buy a DELTA 38 SINGLE and PLUS 1 Interface together for £59.95

NEW III DELTA 350 SINGLE-MASTER COMPACT or ELECTRON FIRST BYTE INTERFACE £19.95

Optical Feed Back. The joystick is fitted with 5 coloured lights to show you exactly when a switch has operated, so you need only move the joystick a minimum amount, and can be certain that you have given a true diagonal signal to the computer.



Available from your dealer
or direct from us



Voltmace



Unit 9
Bondor Business Centre
London Road
Baldock
Herts SG7 4NG
Telephone: (0462) 894410

ONE of the bugbears of the otherwise excellent Advanced Disc Filing System (ADFS) in the Plus 3 is that it consumes a vast amount of memory.

On power-up or after Control+Break the ADFS grabs nearly 4k of free ram. This leaves just 4.5k of memory for your program if you want to use all eight colours in Mode 2 or high resolution Mode 0.

This is a serious problem for programmers developing software and is one of the reasons why there are so few games available on Plus 3 disc.

There are remedies though, but these create more problems. The standard solution to the lack of memory is to load the program in Mode 6, select the tape filing system and relocate the program by moving it down to &E00.

This recovers the lost memory and enables much longer programs to be run from disc. Many *Electron User* games use this method.

Problems occur, however, when you want to access the disc again. If you try moving the program back up to &1D00 and select the ADFS you'll just get error messages.

Once you've used the ADFS' workspace it won't initialise itself and steadfastly refuses to work. So,

Restore your ADFS workspace

ROLAND WADDILOVE shows how to access the ADFS after relocating a program

you can't access the disc once a program has been relocated.

The only solution is to clear the memory used by the ADFS either by switching the Electron off or pressing Break after entering *FX200,2.

This is a nuisance if you are developing software, or even simply typing in an *Electron User* listing, and makes menu driven programs which run from disc impossible – until now.

ADFS Restore, the utility presented here, will enable a program that has been relocated to access the disc system. It works by relocating the program again – moving it back up to &1D00 – before initialising the ADFS.

The program is written in machine code and occupies just one page of memory – 256 bytes. To create the

utility, first enter the listing, save it then run it. The machine code will be saved to disc with the name ADFS.

When you want to run a program which relocates down to &E00 first load the machine code with:

*LOAD ADFS

and then CHAIN your program as normal.

To access the disc, Escape from the program (don't press Break) and call Restore with:

CALL 8900

Your program will be moved back up to &1D00, the ADFS initialised and the disc in the drive *MOUNTed. You can now save the program or CHAIN another. The program stays intact throughout the operation – which takes just a fraction of a second.

The utility is quite straightforward and is in

two sections. The first part moves the program back up to &1D00 and the second initialises the ADFS.

You'll see two data statements at the end of the listing containing around 130 bytes of data. This is the whole of the ADFS' 3.75k (3,840 bytes) of workspace in a highly compacted form.

The second half of the utility simply expands this data, restoring the ADFS workspace so that it thinks you've either just switched on or pressed Control+Break. It then selects the ADFS with *ADFS and mounts the disc with *MOUNT.

This powerful utility opens up a whole new world and it's now possible to run long programs from disc, relocate them and still be able to access the disc afterwards – without pressing Break or switching off.

```
10 REM ADFS Restore
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 workspace=&E70
50 from=&E72
60 to=&E74
70 FOR pass=0 TO 2 STEP 2
80 PX=&0908
90 EOPT pass
100 \relocate program
110 LDY #0:STY workspace
120 STY from:STY to
130 CLC
140 LDA #0:STA from+1
150 LDA #0:STA to+1
160 LDX #0:43
170 .loop
180 LDA (from),Y
```

```
190 STA (to),Y
200 DEY:BNE loop
210 DEC from+1:DEC to+1
220 DEX:BNE loop
230 LDA #130
240 LDY #128
250 JSR &FFF4
260 LDX #key MOD256
270 LDY #key DIV256
280 JSR &FFF7
290 \restore ADFS
300 LDA #0E
310 STA workspace+1
320 LDY #0
330 .loop
340 LDA table,X
350 LDY table+1,X
360 .again
```

```
370 DEY
380 STA (workspace),Y
390 BNE again
400 CLC
410 LDA table+1,X
420 ADC workspace
430 STA workspace
440 BCC ok
450 INC workspace+1
460 .ok
470 INX:INX
480 CPX #0:8A:BNE loop
490 RTS
500 .key
510 EQUUS "K.O.P.A.=&1000:MO.
\ADFS\MO.M\CHRST5
520 .table
530 J
```

```
540 NEXT
550 REPEAT
560 READ a$
570 !PS=EVAL("X"+a$)
580 PX=PX+4
590 UNTIL a$="1FF"
600 *SAVE ADFS 900 +100
610 DATA FF00FF00,1100200,
1010300,CF7200,1780900,1FF2
200,1221000,160E155,1650173,
1220174,1600150,1220176,160E
155,1650173,1220174
620 DATA 1600100,CF00176,F
FF00FF00,FF00FF00,FF00FF00,FF
00FF00,FF00FF00,1220A00,160E
155,1650173,1220174,1600100,
1220176,160E155,1650173,1220
174,1600100,CF00176,1710E00,
1FF
```

Learning CAN be fun

- Use your Electron to teach and amuse your children at the same time.
- Three packages crammed full of educational programs - and so easy to use!
- Each program has been educationally approved after extensive testing in the classroom.

ONLY
£4.95 tape
£5.95
3½" disc



Ages 2-5

Alphabet
Colours
Counting
House
Magic Garden
Matchmaker
Numbers
Pelican
Seaside
Snap



PELICAN

Teach your children to cross the road safely at a Pelican crossing



HOUSE

Select the colours to draw a house - hours of creative entertainment

Ages 5-8

Balance
Castle
Derrick
Fred's Words
Hilo
Maths Test
Mouser
Number Signs
Seawall
Super Spell



NUMBER SIGNS

Provide the correct arithmetic sign and aim to score ten out of ten



BALANCE

Learn maths the fun way. Type in the answer to balance the scales

Ages 8-12

Anagram
Codebreaker
Dog Duck Corn
Guessing
Hangman
Maths Hike
Nim
Odd Man Out
Pelmanism
Towers of Hanoi



HANGMAN

Improve your child's spelling with this fun version of the popular game



ODD MAN OUT

Find the word that does not fit - before your time runs out

TO ORDER TURN TO THE FORM ON PAGE 53

I INTRODUCED the concept of using the Electron as a prime means of supporting your child's school-based education last month. I also looked at the availability of educational software for the pre-school and infant age group.

Now I want to deal with the demanding and important junior school years.

My first experience of a micro as an instrument of learning was fairly disastrous. As a head of department in a thriving middle school, I was presented with what appeared to be a sparkling pocket calculator with a funny looking box attached to the back.

The calculator was in fact a Sinclair ZX81 and my headmaster was determined I should initiate my charges to computer-based learning.

None of the nine year olds in my group had ever seen a computer before and were as puzzled as I was in our efforts to make sense of the buttons and wires.

Eventually after dozens of attempts to stop the ram pack wobbling and some over-heating problems, I returned the miracle to my headmaster with the suggestion that somebody else might like a go.

It was an experience neither I, nor I suspect, my pupils will never forget. Yet only six years later we, as teachers and parents, are coping with 7 to 11-year-olds who are, on the whole, computer literate.

This year is the first time I can say that children in all four years of my junior school have a full working knowledge of micros. While I, as their headteacher, write for a national computer magazine. How quickly time and knowledge changes.

Meanwhile at home, as parents we become disillusioned as little Johnny spends every waking hour bashing space-invaders, when our original intention



In Part II of his series **NIC OUTTERSIDE** examines educational software for junior school pupils

in buying a computer was to support his schooling.

Thankfully educational software is plentiful. Indeed the surfeit of software can make the choice very difficult.

On the reading and writing front, the range and scope is quite breathtaking. You won't go far wrong in buying any ASK (Acornsoft) release, particularly the Best Four Language Pack mentioned last month.

For the older child ABC, Talkback and Workshop provide some avant-garde ideas in language education, but are not a substitute for structured teaching of spelling and reading.

Highlight Software's Read Right Away and Reading Packs 1-4 are excellent value and provide a varied assortment of reading and spelling programs.

Magic E, Break-in, Sort out and Letter bug are particularly good programs which will probably be played ad-nauseam.

The Mr Men Magic Story Maker and Crack-It Towers from Mirrorsoft are two particularly relevant programs

to build on creativity and logical thinking respectively.

At £9.95 each they are good value, though they are available at knockdown prices from some mail order companies.

I also recommend Database Software's Fun School packages. Castle, Super Spell, Anagram, Code-breaker and Hangman, are additive and excellent educational value. Both the 5-8 and 8-12 packages are available at only £4.95 each.

Golem Software is a company I have long admired and its Fun with Words, Education 1 and 2 packages are bargains at £6.50 each.

Particularly helpful are Suffix, There and Hangman which develop spelling and phonic structure in a most imaginative way.

Each of these programs can be introduced to the child with the minimum of explanation and he or she can be left to enjoy the software for its own sake. Obviously, back-up written work would be advantageous though not altogether essential.

For the BBC Micro,

4Mation has earned a reputation as producer of excellent text adventure-based learning programs.

Your child may well be familiar with Granny's Garden or Flowers of Crystal already. Although 4Mation do as not yet code its software for the Electron, there are some superb adventure based programs from other suppliers.

Comsoft's Serpent's Lair is currently selling at £3.95 and is an excellent introduction to this genre. Equally, LCL's Sir Francis Drake is an

Turn to Page 27 ►

Get knitting on your micro with *Knitwear Designer*

Now you can use your BBC Micro or Electron to design perfectly-fitting knitwear – then print out the complete pattern.

It's the biggest development since the home knitting machine – and it's so simple to use. Now anyone can use a computer to design knitwear to individual measurements and then produce row-by-row knitting instructions on the printer.

YOU CAN:

- Work with any yarn, from fine cottons to chunky wools
- Enter your natural tension and the pattern adjusts to the way you knit
- Select from three preset patterns – Raglan sleeve, drop and square shoulder
- Use the Freehand program to produce custom designs

Say goodbye to badly-fitting home knitting. With one of the five programs included in the package, and using the clearly written manual, you can produce perfect results every time.

The program itself produces a plain knit, leaving you to use your own favourite stitch pattern, such as the Fair Isle design featured here.

£8.95

Cassette

Also available on disc for use on the Advanced Plus 4 and Slogger SEDFS.

£9.95

5¼" disc

DATABASE PUBLICATIONS



To order
please turn
to the form
on Page 53

◀ From Page 25

educational and exciting jaunt into the land of adventures.

Other good introductory adventures which come to mind include Usborne's *Island of Secrets*, Potter's *Adventure 4 Pack* and Acornsoft's *Sphinx Adventure*.

These can act as a medium to stimulate reading, improve spelling and increase powers of logical decision-making. They can become addictive, and provide stimulus for other creative work, such as model making or story writing.

Kosmos Software's *Answer Back* quizzes are upmarket educational rearrangements of the *Trivial Pursuit* concept and can act as stimuli for further learning and can provide hours of family fun.

At £8.95 with factfiles at only £4.95 each, they are sound educational investments.

On a more diverse track, BBC Soft's *Wordplay* is a marvellous introduction to word processing and at £9.95 may provide a springboard for your child's future creative writing.

Software to help numeracy development and general primary mathematics also abounds, though liaison between home and school is important here to avoid concept clashes.

Duckworth's *Competitive Maths* is a good buy at £5.95 and will help strengthen mental arithmetic and consolidation in the four rules of number.

Micro Power's *Junior Maths Pack* is also excellent value with *Number Spin* and *Coordinates* being computer adaptations of classroom teaching techniques.

Quick Thinking Plus by Mirrorsoft is a scintillating

package with two games to give practice with number skills.

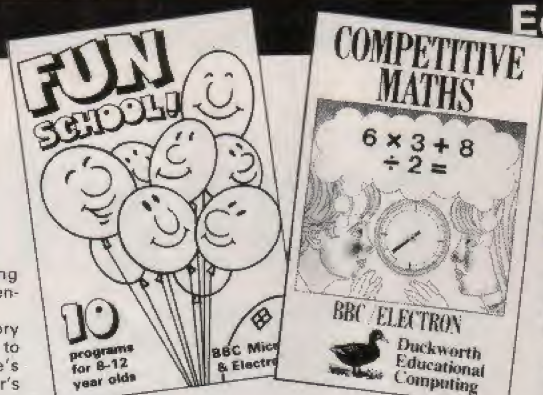
Sum Vaders requires quick thinking in addition, subtraction, multiplication and division to halt alien space-craft from landing.

Robot Tables gives a player the chance to create robots using number sequencing skills.

A program I have used to exhaustion is ASK's *Table Adventures*, which includes four games to improve tables knowledge. Underground Escape is my favourite. It involves mastery of factors in order to escape from a quickly flooding pothole.

Each stage progresses to a final self test. The whole package is exciting and graphically outstanding, and at £9.95 must represent a bargain.

Once again I recommend the *Fun School 5-8* and *8-12* packages. Denary Derrick,



Hilo, Balance, Number signs, Maths Hike and Towers of Hanoi are mind-stretching pieces of wonder which together with the aforementioned language offerings, are an essential purchase for any parent of a primary age child.

Other Database Software programs I have used extensively with youngsters include Angler, Table Mountain, Mapping, Manipulation and Fun Factors.

Angler is an original game which helps a child estimate the size of angles up to 45 degrees. Mapping involves careful use of mapping diagrams to display number bonds.

Fun Factors is a colourful ladders and levels game to consolidate factor knowledge.

Manipulation is an advanced calculation exercise which will stretch even adult minds, while Table Mountain is a fabulous pro-

gram to teach and practise multiplication tables.

Each of these programs has been featured in back issues of *Electron User* and in the *Educational Specials* published in 1985.

They have also been available on occasional tape offers such as *Educational Special Volume 2*, which at £3.95 is an absolute give-away.

All add a new dimension to a subject which for many children is difficult or even boring. Maths is fun, and computer based mathematics is truly exciting, even for the innumerate pupil.

So all in all, the software is available and will do much to change a games orientated computer into a vital learning aid.

You never know, your child may even end up preferring the educational software to the shoot-'em-up trivia to which he once was so addicted.

As I mentioned last month, most of the software mentioned can be ordered from the software mail order companies which advertise in this magazine. Notably, 21st Software, Rams Computer Centre, C&F Associates and Mithras offer many at sale prices. ■

Contacts

ABC

19 Crumstone Court, Killybeg, Tyne and Wear

Applied Systems Knowledge (ASK)

London House, 68 Upper Richmond Road, London SW15 2RP
Tel: 01-874 6046

BBC Soft

35 Marylebone High Street, London W1M 4AA

Database Software
Europa House, 68
Chester Road, Stockport
SK7 5NY

Tel: 061-456 8383

Duckworth

The Old Piano Factory, 43
Gloucester Crescent,
London NW1 7DY
Tel: 01-485 3484

Golem Software

77 Qualitas, Bracknell,
Berkshire RG12 4QG
Tel: 0334 50720

Highlight Software

36 Sherbourne Close,
Barry, South Glamorgan

Kosmos Software
1 Pilgrims Way, Harlington,
Dunstable, Bedfordshire

LCL

26 Avondale Avenue,
Staines, Middlesex

Micropower

Software Bargains, 8/8A
Regent Street, Leeds LS1 4PE

Tel: 0532 687735

Mirrorsoft

Maxwell House, 74 Worship Street, London EC2A 2EW

Tel: 01-377 4600

ENTER THE THIRD DIMENSION...

YOU'VE probably seen three dimensional representations of aircraft, machine parts, molecular structures and whatever else the human mind can think of created on powerful micros and mainframe computers.

They can be rotated enlarged and reduced, apparently without effort, by pieces of software that are without doubt very complex, running on computers much faster than our own, humble Electron.

Surprisingly, the basic idea is simpler than you may at first imagine.

In this article we're going to see how we can produce our own 3D images on the Electron.

To understand the workings of 3D graphics, it is first necessary to understand 2D or flat plane graphics.

The computer screen can be thought of as being a flat plane, somewhat akin to a sheet of paper. As such we can only move in four absolute directions — left and right in the X plane or up and down in the Y plane.

By drawing relative to both planes at the same time we produce diagonal lines, and by varying the

relative speeds we can vary the angle and curvature of a given line.

In 3D space however, we have to consider another physical plane, known as the Z plane. The position of any point on the Z axis is its distance from the observer.

This is not as strange as it may appear. Everything we do in life, from picking up your cup of tea to driving a

car, involves movement through 3D space.

Our brains calculate the distance an object is away from us (its position on the Z axis) using both eyes, so-called binocular vision.

Try closing one eye and then moving around, picking things up and so on. Because you now see everything in two dimensions, distance becomes

much more difficult to judge.

The position of an object in 3D space can be defined by specifying its X,Y,Z coordinates. Figure I shows the positions of the X,Y and Z axes and the coordinates of a cube, which is centered around 0,0,0.

For the moment let's forget the Z coordinates. This leaves us with the X,Y

ANDRÉ MOERENHOUT shows how to create 3D wireframe graphics on the Electron

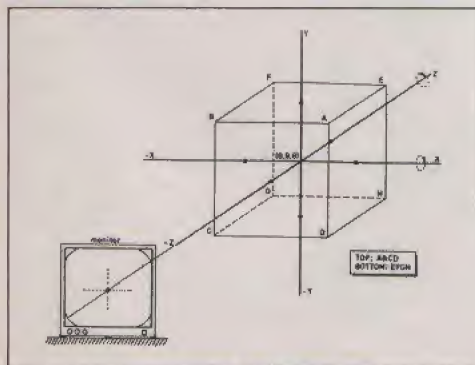


Figure I: A 3D cube showing X,Y and Z coordinates

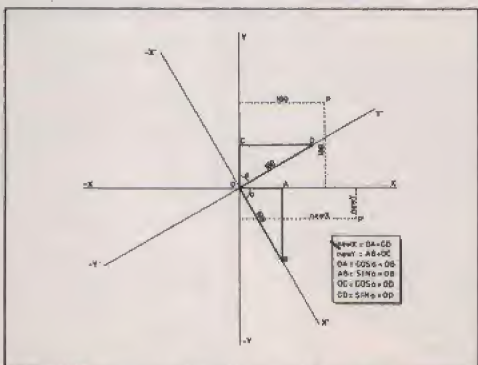


Figure II: The effect of rotating Z with respect to X and Y


```

10 REM 3D Cube
20 REM BY A.P. Moerenhout
30 REM (c) Electron User
40 :
50 MODE4
60 VDU23,8202;0;0;0;
70 PROCint
80 REPEAT
90 PROCcalc
100 CLG
110 VDU28,32,31,39,1
120 PRINT"turnX" ; turnX
xstep"stepX" ; dist"dist" ; scale
e"stepX" ; step
130 VDU28,27,31,39,21
140 FOR IX=0 TO 7
150 IF IX=4 PRINT
160 PRINTp(IX,0),pX(IX,1)
170 NEXT
180 PROCplot
190 xturnX=(xturnX+stepX)
MOD 360
200 zturnZ=(zturnZ+stepZ)
MOD 360
210 distX=distX+stepX
220 scale=scale+step
230 UNTIL0
240 END
250 :
260 DEFPROCint
270 DIM p(7,1)
280 @X=000405
290 PROCvars
300 MOVE0,0: DRAW1279,0: DRAW
W1279,1023: DRAW0,1023: DRAW0,0
310 MOVE32,32: DRAW736,32:0
RAW736,991: DRAW32,991: DRAW32
,32
320 VDU19,0,4,0;
330 VDU23,1,0,0;0;0;
340 VDU24,48,48;720;975;
350 VDU29,380;512;
360 VDU28,25,31,39,1
370 PRINT"turn: " ; zturn
n: "" ; xstep: "" ; zstep: ""
380 PRINT"dist: " ; scale
e: "" ; dstep: "" ; sstep: ""
390 PRINT TAB(4,18) "X's Y
's";
400 VDU28,25,31,39,21
410 FOR IX=0 TO 7
420 IF IX=4 PRINT
430 PRINTCHR$(IX+97);";"
440 NEXT
450 ENDPROC
460 :
470 DEFPROCvars
480 dist=1E6: dstepX=0
490 scale=1.5: sstep=0
500 xturnZ=0: zstepZ=5
510 zturnZ=0: zstepZ=5
520 ENDPROC
530 :
540 DEFPROCcalc
550 LOCAL xZ,yX,zX,xts,xtc
,xts,etc,R
560 RESTORE 700
570 xts=SIN(RAD(xturnZ))
580 xtc=COS(RAD(xturnZ))
590 zts=SIN(RAD(zturnZ))
600 ztc=COS(RAD(zturnZ))
610 FOR IX=0 TO 7
620 READ xZ,yX,zX
630 R=distX/(distX+xts+xtc
+xts-yXztc+xts+zXxtc)*scale
640 p(IX,0)=(xZ+xts+yXztc
s)*R
650 pX(IX,1)=(yX+ztc+xtc-x
Z+xts+xtc+zXxts)*R
660 NEXT
670 ENDPROC
680 :
690 REM Cube coordinates
700 REM Top plane (ABCD)
710 DATA -100, 100, -100
720 DATA -100, 100, -100
730 DATA -100, -100, -100
740 DATA 100, -100, -100
750 REM Bottom plane (DEFG)
760 DATA 100, 100, 100
770 DATA -100, 100, 100
780 DATA -100, -100, 100
790 DATA 100, -100, 100
800 :
810 DEFPROCplot
820 PLOT4,pX(0,0),pX(0,1)
830 FOR IX=1 TO 3
840 PLOT 5,pX(IX,0),pX(IX,
1)
850 NEXT
860 PLOTS,pX(0,0),pX(0,1)
870 FOR IX=4 TO 7
880 PLOTS,pX(IX,0),pX(IX,1)
890 NEXT
900 PLOTS,pX(4,0),pX(4,1)
910 FOR IX=1 TO 3
920 PLOT4,pX(IX,0),pX(IX,1)
930 PLOTS,pX(IX+4,0),pX(IX
+4,1)
940 NEXT
950 PROCletters
960 ENDPROC
970 :
980 DEFPROCletters
990 VDU5
1000 FOR IX=0 TO 7
1010 MOVEpX(IX,0),pX(IX,1)
1020 IF pX(IX,0)>0 THEN PLO
T0,10,0 ELSE PLOT0,-62,0
1030 IF pX(IX,1)>0 THEN PLO
T0,0,30
1040 PRINTCHR$(IX+97);
1050 NEXT
1060 VDU4
1070 ENDPROC

```

Program 1

pair, which can be used directly as the familiar screen coordinate.

If the cube was drawn in just the X and Y planes, only one side would ever be visible. That of course, is not the correct way to represent a cube.

We want to be able to look at it from every conceivable angle, and above all, from different distances. This is

the point where the Z coordinate comes into play.

The following set of equations convert a 3D coordinate X,Y,Z into its 2D equivalent:

$$R = \text{dist} / (\text{dist} + X \cdot \sin(Z) + \sin(X) - Y \cdot \cos(Z) + \sin(X) + Z \cdot \cos(X)) \cdot \text{scale}$$

$$XP = (X \cdot \cos(Z) + Y \cdot \sin(Z)) \cdot R$$

$$YP = (Y \cdot \cos(Z) + X \cdot \sin(Z) - X \cdot \sin(X) + Z \cdot \cos(X) + Y \cdot \sin(X)) \cdot R$$

```

xturn: 40
zturn: 40
xstep: 5
zstep: 5

dist: 1E6
scale: 1.5
dstep: 0
sstep: 0

X's Y's
a: 211 -82
b: 01 -110
c: -211 -110
d: 10 -250

e: 211 110
f: -10 250
g: -211 02
h: 10 -65

```

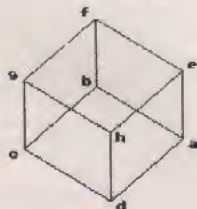


Figure III: The spinning 3D cube drawn by Program 1

Unfortunately an explanation of how they work is beyond the scope of this article. The maths involved is advanced, and involves the multiplication and transformation of matrices.

When all the relevant points of a 3D shape are known, however complicated that shape may be, it can be manipulated anyway you like by recalculating the coordinates.

To give a hint of how the recalculation works take a look at Figure II, which shows how rotation around the Z axis effects the values

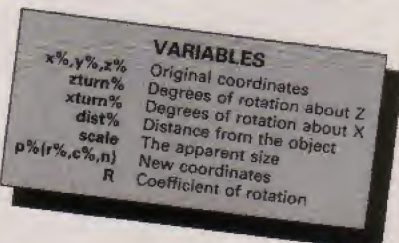
of X and Y.

By way of demonstration, Program 1 rotates a wire frame object through various different views. The program is short and fairly straightforward.

You can experiment with the variables in PROCvars and watch the effect on the object, but be careful not to alter them too much or you'll loose track of what is happening.

As you can see in lines 710-790, the cube is centered around 0,0,0. This

Turn to Page 30 ►



Programming

```

10 REM 3D-Text
20 REM by A.P. Moerenhout
30 REM (c) Electron User
40 :
50 MODEL
60 PROCINIT
70 PROCstring("User",-200
,2)
80 PROCstring("Electron",
-50,3)
90 PROCstring("xturnX="+S
TR$(xturnX),150,1)
100 PROCstring("zturnX="+S
TR$(zturnX),400,1)
110 END
120 :
130 DEFPROCinit
140 DIM p(8,0,1)
150 PROCvars
160 xts=SIN(rab(xturnX))
170 xtc=COS(rab(xturnX))
180 zts=SIN(rab(zturnX))
190 ztc=COS(rab(zturnX))
200 VDU23;8202;0;0;0;
210 VDU29;640;512;
220 VDU19;2;4;0;
230 ENDPROC
240 :
250 DEFPROCvars
260 distX=00;scale=1
270 xsize=16;xturnX=-10
280 ysize=16;zturnX=0
290 ENDPROC
300 :
310 DEFPROCstring(AS,yposX
,colX)
320 GCOLB,colX
330 xposX=4*xsizeX-LENAS*4
*xsizeX
340 FOR LX=1 TO LENAS
350 FOR cX=0 TO 8
360 SOUND1,-15,10,1
370 FOR rX=0 TO 8
380 PROCcalc((rX-4)*xsize
X)+xposX,((4-cX)*ysizeX)+ypo
sX)
390 pX(rX,cX,0)=XX:pX(rX,
cX,1)=YX
400 NEXT
410 NEXT
420 AY=10:XX=880:YX=0
430 ?680=ASC(MID$(AS,LX));
CALL$FFI
440 FOR cZ=0 TO 7
450 FOR rX=0 TO 7
460 IF c?68F AND 2^(7-rX)
PROCfilldot(rX,cX)
470 NEXT
480 NEXT
490 xposX=xposX+8*xsizeX
500 NEXT
510 ENDPROC
520 :
530 DEFPROCfilldot(rX,cX)
540 PLOT 4,pX(rX,cX,0),pX(
rX,cX,1)
550 PLOT 4,pX(rX+1,cX,0),p
X(rX+1,cX,1)
560 PLOT85,pX(rX+1,cX+1,0)
,pX(rX+1,cX+1,1)
570 PLOT 4,pX(rX,cX+1,0),p
X(rX,cX+1,1)
580 PLOT85,pX(rX,cX,0),pX(
rX,cX,1)
590 ENDPROC
600 :
610 DEFPROCcalc(cX,X,Y)
620 R=distX/(distX+xztsX
xts-yX*ztctXts)scale
630 XP=(xX*xtctX+Yzts)R
640 YP=(yX*xtctX+cX*xzts
*xtc)R
650 ENDPROC

```

Program II

From Page 29

ensures that it stays at approximately the same position on the screen while it is being manipulated.

This is by no means necessary, and the cube could be positioned anywhere on screen, although it could soon vanish if not placed correctly.

Additionally, there's nothing to stop you from putting two or more shapes on the screen simultaneously.

Enter and run program II. It displays 3D text on the screen. The effects obtained can be best explained by holding a sheet of paper in front of your eyes, and turning it without folding or bending, any way you like.

Like Program I, you are rotating a 2D plane in a 3D environment. Anything written on the paper has no depth of its own.

This explains the absence of the Z coordinate in PROCcalc. The text is positioned in the plane Z=0.

PROCstring is the main procedure. Three parameters are passed to it – the string to be printed, the vertical screen coordinate yposX and a colour.

The horizontal coordinate is calculated at line 330. This ensures the text is centered, but you could alter this by specifying xposX when you call the procedure – add a fourth parameter and delete line 330.

Note that the graphics origin is in the middle of the

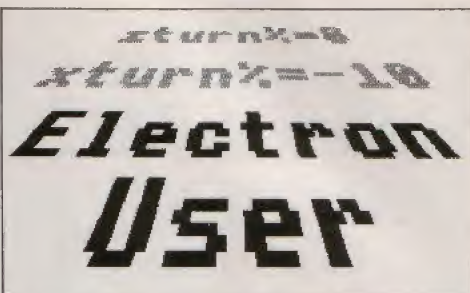


Figure IV: 3D text drawn on a grid

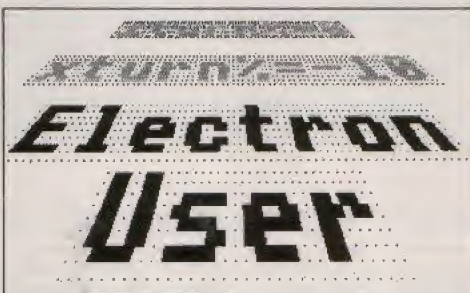


Figure V: 3D text showing the 81 point grid

screen.

The procedure sets up an 81 point grid and moves this to the position specified xposX, yposX. All 81 points are then recalculated to new 3D equivalents – lines 350-410.

The dot pattern of the character under scrutiny is first read and then checked for the appearance of dots.

When one is found the corresponding rectangle is filled by lines 440-480. To make things a bit clearer insert the following lines:

```

385 GCOL 8,3
386 PLOT 69,XP,YX
387 GCOL 0,colX

```

Once again, you can experiment with the variables in PROCvars. If you hear a tick but can't see

anything happening, it probably means the program is plotting off the screen.

So far I've omitted to say a few words about another feature of the equations, namely the control of perspective.

The principle variable in the programs that affects perspective is distX.

The closer you get, the more pronounced the perspective will become. The effects are rather like looking in the wrong way through a telescope.

By experimenting with both programs and examining the listings you'll soon become familiar with the effects which can be produced and the methods involved.

nursery rhymes



5 fun-packed educational programs
... for young children everywhere



This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

- ★ Tell the time with Hickory Dickory Dock.
- ★ Assemble the jigsaw in Humpty Dumpty.
- ★ Learn to spell with Jack and Jill.
- ★ Match the animals in See Saw Marjory Daw.
- ★ Play an exciting game in Hey Diddle Diddle.

Children as young as two will be entertained for hours with these interactive programs. Don't miss out on this beautiful gift for your family – and at a very special price.

ONLY £5.95 (cassette)
£6.95 (3 1/2" disc)

Suitable for any Acorn Electron

TO ORDER PLEASE USE THE FORM ON PAGE 53



Around the World in 40 Screens



AMERICA



THE OCEANS



THE ARCTIC



THE ORIENT



AFRICA

Repton Returns ... to Conquer the World

After the success of Repton 3, we were overwhelmed with requests for us to publish another set of screens for the game. We have now produced 40 new screens which, although enticingly amusing, are even trickier to complete than the original 24 screens of Repton 3.

These new screens feature Repton voyaging around the world. In America, Repton is a sheriff with a penchant for hamburgers and whisky; his job is to jail all the bandits and avenge the Red Indians. The Arctic sees Repton as an eskimo being "holly" pursued home to his Igloo by polar bears and penguins. Across to the Orient, and Repton is a kung-fu master amongst the pagodas, rickshaws and Chinese dragons. Repton becomes a deep-sea diver in the Oceans; he searches for pearls around the rotting shipwrecks which are inhabited by dangerous octopuses and squids. Finally, in Africa, Repton reaps his rewards by defeating the tribesmen, caging the parrots, and collecting the apples, bananas and pineapples — whilst watching out for falling coconuts!

Each copy of Around The World in 40 Screens includes:

- the Repton 3 main program,
- the Repton 3 editor, and
- the 40 new game screens.

BBC Micro Cassette£6.95

Acorn Electron Cassette ..£6.95

BBC Micro 5¼" Disc£7.95

BBC Master Compact 3½" Disc£9.95

(Compatible with the BBC B, B+ and Master Series computers).

The screen pictures show the BBC Micro version of the game.



THE SCREEN EDITOR



THE CHARACTER EDITOR

PRIZE COMPETITION

If you complete all 40 screens of Around The World, you can enter our competition. Prizes include £200 in cash, with Repton mugs, badges, pens and certificates for runners-up. Closing Date: 31st January, 1988.



FREE REPTON BADGE WITH EVERY GAME SOLD

A colourful Repton badge is included free with every cassette or disc of Around The World in 40 Screens.



ACORN SOFTWARE

Please make all cheques payable to "Superior Software Ltd"



OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post
- Postage and packing is free
- Faulty cassettes and discs will be replaced immediately

Dept. A2, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453.

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

Witchcraft

Exercise your brain and solve JOANNE STEVENS' intriguing puzzle

WITCHCRAFT is a fascinating puzzle designed to stretch your powers of logic and reasoning to the limit. Slow down, take a break from zapping aliens, give your fingers a rest and exercise the old grey matter for a change.

This one player game is based on a three by three grid, shown in Figure 1. The Micro Kid is surrounded by the wicked witch Zelda, and your task is to reverse the situation so the Micro Kid surrounds the witch, as in the puzzle target on the right of Figure 1.

The control keys are shown underneath the puzzle and you can zap any of the witches in the grid by pressing the corresponding key below. You can't press a key with the Micro Kid on.

The effect of a key is to switch certain squares so a witch becomes a Micro Kid and a Kid becomes a witch.

The keys in the corners (Q, E, C and Z) reverse a block of four squares, the one in the middle (S) reverses the central cross while the ones in the middle of each side (W, D, X and A) reverse that side. Figure 1 summarises the effects of

the control keys.

Once you have solved this puzzle you'll be presented with the next - there are eight in all. You have 120 seconds (two minutes) to solve the first one, 110 seconds for the second, 100 for the third, then 90 and so on.

If you turn all the squares into the Micro Kid there won't be any witches left to zap and you'll have failed to solve the puzzle. Be careful, this is quite easy to do without realising it.

Turn to Page 35 ►



Figure 1: The opening screen

SAVE

... up to £5 on nine
quality educational
programs

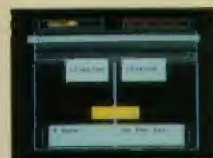
Full-length programs
designed to stimulate,
educate and entertain
— in school and at home



Windmill: Word, number
and colour recognition



Angler: Fun with angle
estimation



Spellroid: Learn to spell
with our friendly robot



Tortal: Teach and test
the rules of single addition

PLUS:

Database: A comprehensive database for the young learner.
Chinese Takeaway: Teach and test the rules of simple subtraction.
Fun Factors: Arcade style factor learning.
Discovery: A strategy based phrase identification game.
Punctuation: Test and teach the rules of punctuation.

Educational Computing on the Electron

Volume 2 of *The Micro User* Education Special contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation — and there's an excellent introductory database.

The programs on the tape and disc have been adapted for the Electron and the magazine contains all the original listings together with advice on how they can be adapted to cater for individual needs.

Covers all age ranges from infants to secondary.



+



=

£3.95

Normal price £5.95

£2
Saving!



+



=

£4.95

Normal price £9.95

£5
Saving!

**To order turn to the
form on Page 53**

Witchcraft listing

4 From Page 33

```

13 REM Witchcraft
20 REM By Joanne Stevens
30 REM (c) Electron User
40 MODE 1
50 PROCinitia:ise
60 PROCc:screen
70 p:axis:=0
80 box:=16
90 T:=13200
100 REPEAT
110 PROCstart
120 REPEAT
130 PROCkey
140 PROCdisplay(box:=5,10)
150 UNTIL box=targetX OR
TIME:=T OR box=511
160 COLOUR 13:COLOUR 0
170 IF box=511 OR TIME=T
PRINT TAB(49,20) you've l
ailed...:box:=511:YOU T
HE SE PRINT TAB(12,20) Well do
no...

```

```

180 KEY=INKEY$
190 UNTIL puzzle=8 OR box1
=511

```

```
280 PRINT TAB(6,29) "Do yo
want to try again? "
```

```
290 IF INSTR('Y',GET) THEN
FN RUN ELSE MODE 6
```

220 END

```

230
240 DEF PROCkey
250 PRINT TAB(37); 25)CY:GOTO

```

```

250 PRINT TAB(27,25) TIME:
      (TIME-TIME)DIV 100
      345  KK=INT(30/100) GOTO 500:GOTO 500

```

```
260 XX=INSTN('WEASOLIC',
INKEY$)-2
```

```

270 IF K2>-1 IF K2<9 IF (
01X AND 2*(8-K2))=8 DO:Z=DO:

```

```

1 EOR r14X(KX):SDUMB 2,-9,
2,1:FX21

```

288 ENDPROC
290

```
300 DEF PROCstart
310 RESTORE 350
```

```

328 FOR I2=1 TO puzzle
329 READ tagset

```

```

330 READ targets
340 NEXT
350 GOTO 100 IF CDB=1 AND TCB=1

```

358 DATA 495,188,341,188,
81,471,146,325

```

360 puzzle=puzzle+1
370 ix=ix+1280

```

```
380 PROCdisplaytarget%,2
,1E)
```

```
39# PROcdisplay(box2,5,10
40# VDU 7:=FX178,233
```

410 COLOUR 131: COLOUR E: P
INT TAB(8,29) Solve puzzle

```
number ";puzzle;" "
```

```
430 COLOUR 129:COLOUR 3:P
INT TAB(3,29):SPC(3,3)
```

```

440 TIME=0
450 SUM=0

```

```

450 ENDPROC
460

```

478 DEF PROCinitialise
488 VDU 23,1,0;0;0;0;

```
490  sdata=8A80000000000000
500  RESTORE 1370
```

```

510 FOR I=0 TO 384 STEP 4
520 READ a$

```

```
530 i!sdata=EVAL('G'+a$)
540 NEXT
```

```
550 addr=050
```

```
560 sprite=652
570 FOR i=0 TO 2 STEP 2
580   =M=0
```

```

580 PZ=1900
590 COT i

```

Figure 1f:
The control
keys

PROCEDURES

screen	Set up the screen display
display	Print the puzzle
window	Draw a window
big	Print double height text
start	Define the variables

VARIABLES

box%	The puzzle
target%	The target
puzzle	Puzzle number
T%	The time
	remaining
rule%{ }	The rules

```

600 .display
610 LDX #3
620 loop1
630 LDY #43
640 loop2
650 LDA (sprite),Y
660 STA (addr),Y
670 DEY
680 BPL loop2
690 CLC
700 LDA addr:ADC #48:STA
addr:LDA addr+1:ADC #42:STA
addr+1
710 LDA sprite:ADC #64:STA
sprite:LDA sprite+1:ADC #0:
STA sprite+1
720 DEY
730 BNE loop1
740 RTS
750 J
760 NEXT
770 BIT rule$(S)
780 RESTORE #000
790 FOR I#=0 TO 8:READ rule
#(I):NEXT
800 DATA 432,448,216,290,
86,73,54,7,27
810 VDU 23,255,170,85,170,
85,170,85,170,85
820 ENDPROC
830
840 DEF PROCscreen
850 CLS:#FX178
860 ECOL #,I
870 FOR I#=0 TO 1024 STEP

```

```

830 MOVE B,IX;DRAW 1280,1X
840 NEXT
850 GCOL0,2;MOVE B,0;DRAW
0,1023;DRAW 1278,1023;DRAW 1
278,0;PROC B,0
910 PROCIWindow(4,3,50,1)
924 PRINT TAB(5,1);PROC
g('Witchcraft')
930 PROCIWindow(1,29,37,7)
940 PROCIWindow(4,17,45,9)
950 PROCIWindow(23,17,34,9)
960 PROCIWindow(23,25,35,23)
}
970 YDU 26
980 COLOUR 131;COLOUR 0
990 PRINT TAB(7,20);PUZZL
E 'TAB(26,20) TARGET '
1000 COLOUR 120;COLOUR 2
1010 PRINT TAB(9,23)'W W '
TAB(9,25)'X S 'TAB(9,27)'Z
X '
1020 COLOUR 3;PRINT TAB(3,2)
5)'Keys: TAB(9,14)'==
1030 ENDPROC
1040
1050 DEF PROCIWindow(LX,BX,
LX,LY)
1060 YDU 28,LX,BX,LX,LY
1070 COLOUR 128CLS
1080 YDU 28,LX+1,BX+1,LX+1,
LY+1
1090 COLOUR 129CLS
1100 GCOL0,2
1110 MOVE 30+LX+32,992-TX+3
2
1120 DRAW 64+RX+32,992-TX+

```

```

113B DRAW 54+R32,36B-32+3
114B DRAW 3B-L32,36B-32+3
115B DRAW 3B-L32,992-70+3
116B ENDPROC
117B
118B DEF PROCdig(a3,X,
119B
120B FOR I:=1 TO 2
121B   FOR Y:=1 TO 2
122B     addr:=4300B+(I1+Y+3)
123B     (X1+Y+3)+620B
124B     3pride:=addr+192*(10
125B     (8-X1+3)+31)AND 1
126B     CALL display
127B     NEXT Y
128B     NEXT X
129B ENDPROC
127B
128B DEF PROCbig(a3)
129B   FOR I:=1 TO LEN a3
130B     787B=ASC(MID(a3,I)
131B     10-X:=10-K7B;Y:=B:CALL
132B     FF1F
133B     732B 70 23,225,767,767,7
134B     672,767,767,767,767,767,
135B     235,10,8
136B     732B 70 23,225,767,767,7
137B     672,767,767,767,767,767,
138B     235,11
139B     NEXT
140B ENDPROC
136B
137B
138B REN Wtch
139B DATA A0B0A0B0,A0B0A0B0
140B A0B0A0B0,B15B0A0B0,B251A0B0
141B B0FF7F7F,B0FF7F5B,B0FF7F7F,
142B FFFCFF7F,B0FF7F5B,B0FF7F7F,
143B FFFCFF7F,B0FF7F5B,B0FF7F7F,
144B B0FF7F,A0B0A0B0,A0B0A0B0,B0
145B B0FF7F,B0B0B0B0
146B DATA A0B0A0B0,A0B0A0B0
147B B0FF7F3B1F,B0FF7F7F,B0FFCFC
148B B0FF6B0B,76B0BFF,76B0FC12,
149B 7B0F0BFF,76B0FC1F,7C3F7F7F,
150B 71BFB,EDCBA0B0,23CBA0B0,B0B5
151B B0B5,B0B5B0B5
152B DATA A0B0A0B0,76B0A0B0
153B A141347F,B0B5A0B0,76B0F0B0,
154B 76B5A134,76B0F0B0,76B0769C,
155B EDCB3A,76B0F0B0,76B0E2D4,
156B B0FF7F,C2B2C294,76B0CA94,B0
157B B0B5,76B0B5B0
158B
159B REN Micro Ktd
160B DATA 5B082B5F,5B082B5F,
161B 5B0A5B5F,37763710,7F1B0B5F,
162B 7F0B5F,7F7F7F7F,7F7F7F7F,
163B 7F0B5F,EDCFF7F7,CD6B5B5F,
164B EDCFE,5B0A5B5F,5B0A5B5A,745A
165B 740,741A741A
166B DATA 5B082B5F,5B082B5F,
167B 7F7F7F7F,7F7F7F7F,EDCF,ASC
168B ACKA,B0B0B0FF,5B0B0B7F,25B0B
169B 3A,457A5752,743B0B0B,7A5A5B
170B W,702B1B2,7C44A90B,741A741A
171B 741A741A
172B DATA 5B082B5F,76B02B5B,
173B 7A155B,76B0B0B4,7A5A4A5A,
174B 0B4A5A,7A5A4A5A,707BA55A,
175B 7A5A5A,7A5A5A,7A5A5A5A,
176B 7A5B5B,5B2C1A4B,76B0A5B4,747A
177B 747A,741A741A

```

This listing is included in this month's cassette tape offer. See order form on Page 53.



By Pendragon

New releases make a splash

THIS month is the third Top Twenty I have compiled since I took over the cave nearly a year ago, and it is certainly the most interesting.

Only 27 per cent separates the top and bottom positions, and never has an adventure received as high a vote as that achieved by The Lost Crystal.

The marks are an average of all votes sent in since the

last chart in June, and it's good to see new releases making such an impression.

The mail I have received praising Dodgy Geezers, The Nine Dancers, Kayleth and Oxbridge has been phenomenal.

I am sure I am not alone in believing the quality of Electron adventures has increased manifold during the last year.

It is also pleasing that true classics such as Wheel of Fortune, Myorem and Woodbury End remain firmly in the top ten.

With new releases such as Village of Lost Souls, Suds and The Puppet Man yet to have time to make their presence felt, the next Top Twenty in February should be just as absorbing.

Last month I mentioned an excellent release by Riverdale Software called Suds. Dave Edwards, the author of this spoof on TV soaps, tells me that at one location, by careful examination, the word Pendragon can be found.

Further to this, he is willing to send the first five readers of this column who discover the location advance copies of Riverdale's next adventure, American Suds.

So come on, adventure buffs – the race is on.

This month I received an interesting booklet helping beginners with Gilsoft's Quill. Anyone interested should write enclosing a stamped addressed envelope, to Alan Davidson, 32c Imperial Drive, Airdrie, Scotland, ML6 9EQ.

While on the subject of stamped addressed envelopes, I have been receiving mail without this necessary prerequisite. My pigeons will not carry replies unless you include one.

And if you are asking for maps or solutions, please make the envelope a large one.

I thank James Elson of Exeter for his fantastic array of maps and complete solution to Twin Kingdom Valley. They are too large and numerous to copy for distribution, but I promise to serialise them once Savage Island has been completed.

Many old adventures are currently available at knock-down bargain prices. For instance, all the old Adventure International and Digital Fantasia series can be bought for less than £3 each from a number of suppliers.

Now is the time to build your collection with classics such as Adventureland and

Savage Island before they are deleted, never to return.

One such bargain adventure is the old Melbourne House release, Denis Through the Drinking Glass. It costs as little as £1.50 from some sources.

However, it has come to my notice that there are three different versions, two of them bugged.

If yours crashes when you type I for Inventory or hangs up when you try to SAVE a position, you should return it to the supplier for an immediate replacement.

Last winter, while compiling the Electron Adventure database, I received a complete set of the old Acornsoft adventures.

It seems these are now like gold dust and virtually unobtainable. Many readers have written asking where they can pick up copies of these immortal goodies.

Maybe Superior Software could release an Acornsoft Hits volume containing Philosopher's Quest, Sphinx Adventure, Countdown to Doom and Castle of Riddles. If you think this is a good idea, why not write and let them know.

John Kerr, Jane Forbes and Gary Fisher among others have written claiming to be the first to complete Epic's stunner, The Lost Crystal.

The first full solution I received, however, arrived on April 24th from Robert Henderson of Liverpool. It is the solution I am currently serialising in Hall of Fame.

Congratulations must go to everyone who have completed it – and special thanks to Mark Allen for his set of maps.

Until the keys drop off your Electron, happy adventuring.

TOP TWENTY READERS' VOTES

1	The Lost Crystal	Epic	98%
2	Myorem	Robico	96%
3	Kayleth	Adventure Soft	93%
4	Oxbridge	Tynesoft	92%
5	Dodgy Geezers	Melbourne House	91%
6	Wheel of Fortune	Epic	90%
7	Woodbury End	Shards	89%
8	Rick Hanson	Robico	88%
9	Quest for the Holy Grail	Epic	87%
10	The Ket Trilogy	Incentive	86%
11	Philosopher's Quest	Acornsoft	85%
12	Twin Kingdom Valley	Bug Byte	84%
13	Project Thesus	Robico	83%
14	The Nine Dancers	Larsoft	82%
15	Operation Safraz	Shards	81%
16	Sphinx Adventure	Acornsoft	79%
17	Terrormolinos	Melbourne House	76%
18	Ferryman Awaits	Kansas City	75%
19	Fantastic Four	Adventure Soft	74%
20	Classic Adventure	Melbourne House	71%

Location	Description	Objects	Exits	Result
11	Too dark to see	—	—	—
12	Edge of hot, rocky cliff	Crevice	Go crevice	10
13	In a lake	None	Swim	9
			Swim West	14
			Swim down	20
14	West of lake on secluded ledge	Crevice	East	13
15	Edge of cliff	None	Go crevice	15
16/17	As 11 — maze	—	East	14
18/19	of caves	—	—	—
20	Above lake bottom	Watch	Swim East	21
21	Above lake bottom	Block	Swim North	22
22	Above lake bottom	Knife	Swim up	13



Readers' Hall of Fame

Enthar Seven (continued from last month)

Equip yourself with the spanner, torch, boots, Decibox and Translator. Enter the transportation cubicle and press S1.

You are in familiar territory and can now make real progress. Trace your steps back along the ledge into the misty cavern. Here you should venture NW and S to the grotto, then UP into the alcove. Enter the Twisty maze taking care to LISTEN and follow the song.

Once you have descended to the regular passages, you will soon meet a little man who walks in an anti-clockwise direction. After a one-sided conversation he will exchange a spherical sweet for the pair of boots.

Now go back to the cavern and journey NORTH through the hall of bats, then EAST to discover the Supplies room. The goggles, shovel and mat can be taken and you will now discover a use for the spanner.

If you dig with the shovel in the bat guano you will unearth a diamond. Now go to the transportation cubicle west of the cavern and teleport back to the Command Centre. (More next month.)

— The Boss

The Lost Crystal (continued from last month)

The third part is the largest and most difficult. At the start you should blow your whistle to break the window of the mountain door and unbolt it. Now you can retrieve the hammer and monocle.

Go to the rockfall and a secret passage will be revealed. The Priestess is here and she will swap objects with you. Exchange your whistle for a brass key and use this to enter Barnacle Bill's hut where you can take the

canoe. Ensure you lock the door on the way out.

Hide the canoe and hammer, return to the Priestess and give her the key. Now go and get the canoe, paddle and hammer and make a sortie past Barnacle Bill's hut. Fill the bottle and drink, then row the boat across the water.

Find the red crystal and wear the cloak to get past the Hydra. The cloak will vanish as you enter the temple. Visit the white crystal room and take the necklace. Now go to the red crystal room and drop the crystal. You are transported back to the caves.

Return to the Priestess and give her your bottle. She will give you a green crystal. Find the mermaid and give her the necklace which she will exchange for a weapon to kill the Hydra.

Go to where you last rowed the canoe and GET BOAT with the sail pole. Row it again and kill the Hydra. Go to the grating, drop the hammer and return to the temple. Drop the green crystal in the green crystal room.

The next bit is quite complex. Go to the Priestess and exchange your arquebus for a white crystal which you must give to the mermaid.

Take the black crystal she gives you, to the Priestess, then give your monocle to the mermaid. You should have received a blue crystal and wooden key in return for your errands.

Get the canoe once again. Go to the temple and open the door with the wooden key. Finally drop the blue crystal in the blue crystal room. (More next month.)

— Robert Henderson

Overture & Beginners

The authors of text adventures such as *Wheel of Fortune*, *Classic Adventure* and *Sphinx* ensure the longevity of their masterpieces by inspirational writing and clever puzzle construction. They often add icing to their cakes by confronting you with cunning dead ends.

Only after perhaps, hours of exploration will you realise that a seemingly impossible exit is in fact a doorway to the next part of the game.

In *Sphinx Adventure* the dead ends are often clever and witty.

I remember getting stuck at the bottom of a rock slide, only to discover after numerous attempts to progress that I needed a magic ring to escape from traps such as this.

However, an even better stymie occurred when I was swallowed by a serpent while trying to cross a lake in a boat.

I imagined for a long time

this was a gruesome exit from the game, but later, by chance discovered that striking a match had startling effects.

Recently, while reviewing *Suds*, I was scratching my head for days on a road blocked by my relations from *Emeroyd Farm*. I imagined once again this was the author trying to tell me to travel in a different direction.

Only when I realised that progress elsewhere was completed did I try pouring a bucket of concrete to cement relations. Such is the wit of David Edwards, and I was able to finish part one of the adventure.

A more grotesque blockage appeared in *The Ket Trilogy*. When confronted by a door in mint condition, I tried every method I could find to proceed through the exit to finer riches.

The only clue was a mixed-up loop, which only



confused me further. Eventually a reader helped me out, and by saying *POLO* I created a hole to climb through!

The best dead end I have come across recently, was the wall in the Bogle's cave in *The Lost Crystal*.

I won't reveal the secret,

but maybe you shouldn't sit in the chair.

It just goes to prove we all have blind spots and lateral thinking is an essential skill in opening locked doors.

● Next month I will begin the adventurer's encyclopedia.

Problems Solved

Sphinx Adventure and **Twin Kingdom Valley** account for more than one third of my mail.

Such is the quality of these adventures that they still pose problems some four years after they were released.

Dominic Newman asks how to get to the bronze door in *TKV* and J.Parsons wants to know how to meet the princess in the same adventure.

You must proceed west from the Hall of the Forest King, ensuring you are wearing the amulet.

You will soon discover the bronze door, beyond which is the princess who awaits rescue.

Gareth Jones needs to say *Diaxos* to open the safe in *Sphinx Adventure*, while

John Pidgeon should travel S, S, N, E, W, S, D, D, U from the bear's cave to find the boat. In *Micropower's Adventure* the magic words are *Open Sesame*.

Rosemary Wooldridge should *DIG*, *DROP BEAN*, *DROP WATER* for some magical results in *Softek's Eye of Zoltan*. Does anyone know where I can get a copy of this adventure?

Meanwhile Lee Hancock is stuck at the start of Larsoft's *Rising of Salandra*. You must *SHOUT* or *THROW STONE* to scare the jackdaw, then enter the cave and journey E, S, *GET KNIFE*, N, E, E.

Finally, in answer to Stuart Cooper's plea, the vicious dog in *Castle of the Skull Lord* should be hit with something it likes.



SQUASH

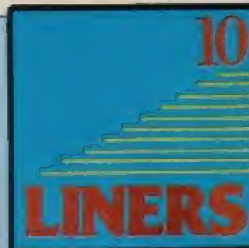
MICRO squash is a single player Electron version of the two player game of the same name and was written by David Harrington. The idea is to keep bashing a ball against a wall for as long as possible without

losing it.

Each time you hit it you score a point and your bat moves up the screen. The more points you gain, the further the bat moves and the harder the game becomes.

In addition there are three difficulty levels to select from. These alter the speed of the ball and the size of the bat.

The controls are: Z to move left and X to move right.



```
1 MODE 5:VDU 23,255,24,6
0,126,255,255,126,66,24,23,1
0;0;0;0:PRINT TAB(5,11)"So
lo Squash" By David Harri
ngton:COLOUR 2:PRINT TAB(2,
16)"Select Difficulty TAB(8,
17)"Level TAB(3,19)"1(hard)-
3(easy)":REPEAT 0X=GET-48
2 UNTIL 0X=0 AND 0X<4:CL
S:COLOUR 130:PRINT"STRINGS(1
9,")FOR Y=1 TO 28:PRINT
TAB(19,Y)"NEXT:VDU 8,32
:COLOUR 128:PRINT"Score:0"
AB(11)"Lives:3":batx=10:ba
ty=28:LZ=3:SZ=0:FX=16
3 bat=10:baty=2:myx=1:mx=
1:REPEAT batx=batx-(INKEY
-67 AND batx<19-05)):(INKE
Y-98 AND batx<1):PRINT TAB(
1,baty)SPC(18):COLOUR 129:P
RINT TAB(batx,baty)SPC(0X)
:COLOUR 128:PRINT TAB(bx,b
y)"
4 bx=batx+mx:by=baty+my
X:IF bx<16X=1:mx=1:SOUND
1,1,80,1) ELSE IF bx>16 bx=

```

```
18:mx=1:SOUND 1,1,80,1
5 IF by<baty GOTO 9
6 IF by<2 by=1:my=1:S
OUND 1,1,50,1:by=2
7 COLOUR 3:PRINT TAB(bx,
by)CHR(255):UNTIL baty=2
8 PRINT TAB(5,12)"Well d
one!"TAB(5,14)"You've won"TA
B(2,16)"Hit R to restart:RE
PEAT UNTIL INKEY=52:RUN
9 IF POINT(bx,baty,131+
bx*32)=1 SZ=SZ+(29-byX):CO
LOUR 2:PRINT TAB(6,31)STR(SX)
:baty=baty+1:my=1:PRINT T
AB(1,baty)SPC(18):baty=bat
y+1:SOUND 1,1,100,1:GOTO 6
ELSE FOR note=5R TO 1R STEP
-2:SOUND 1,1,note,1:NEXT
10 LZ=LZ-1:batx=10:COLOU
R 2:PRINT TAB(17,31)STR(LZ)
:PRINT TAB(1,baty)SPC(18):
baty=28:IF LZ=0 GOTO 3 ELSE
COLOUR 3:PRINT TAB(5,15)"Ga
me over TAB(1,17)"Press R to
restart:REPEAT UNTIL INKEY
=52:RUN
```

ANAGRAMS

THIS two player contest by David Taylor is a simple anagram guessing game.

When it is run you'll be prompted for a word. One player types it in while the other isn't looking, the Electron scrambles it and prints

the anagram. The other player must now guess the word.

Although the listing is fairly simple, there is a useful double height print routine which can be used in your own programs.

THE ANAGRAM IS

CLENOTER

ENTER GUESS :

= ELECTRON

CORRECT

```
1 MODE5:DIW WDS(20),NX(2
0):VDU19,1,5;0;19,3,0;0:COL
OUR1:PRINTTAB(6,0):PROCbig(
'ANAGRAM'):COLOUR2:PRINTTAB(
0,4):ENTER A WORD:COLOUR3:
INPUTTAB(0,10):'WS:LZ=LEN
(WS):CLS:FOR AX=1 TO LZ:WDS(
AX)=MID$(WS,AX,1):NEXT
2 FOR BX=1TOLZ
3 RX=IN$(LX):IF NX(RX)=1
PROCCH:IF GX=1 THEN 3
```

```
4 NX(RX)=1:WDS=WRDS+WDS
(RX):NEXT:IF WRDS=WS FORCE=1
TOLZ:NX(CX)=0:NEXT:WRDS=""
GOTO2
5 COLOUR1:PRINTTAB(2,0):
:PROCbig('THE ANAGRAM IS :')
:COLOUR2:PRINTTAB((19-LX)/2,
0):COLOUR3:PRINTTAB(0,18)
6 COLOURS:PRINTTAB(0,18)
:PROCbig('ENTER GUESS :'):C
LOUR2:INPUTTAB(0,21):'GS
```

```
:COLOUR1:IF GS=WS PRINTTAB(6
,27):PROCbig('CORRECT') EL
E PRINTTAB(6,27):PROCbig('W
RONG'):COLOUR2:PRINTTAB((19-
LX)/2,0):PROCbig(WS)
7 TS=INKEY(200):CLS:PRI
NTTAB(1,10):PROCbig('ANOTHE
R GO (Y/N) ?'):REPEAT:AS=GET
$:UNTILAS="Y"ORAS="N":IF AS=
"Y" THEN RUN ELSE MODE6:END
8 DEFPROCCH:GX=0:FORAZ=1
```

```
TOLZ:IF NX(AX)=0 AX=LEN(WS)
9 NEXT:GX=1:ENDPROC
10 DEFPROCbig(AX):FORIX=1
TOLAX:7X=0:ASC(MID$(AS,IX
,1)):AX=10:IX=0:9X=0:CALL6
FFF1:FORJZ=0TOL:VDU23,255:FO
RKZ=2T09:VDU(490+4JZ)KD19
2):NEXT:VDU255,10,8:NEXT:VDU
11,11,9:NEXT:ENDPROC
```

ACORN ELECTRON COMPUTERS

These computers are fully tested and guaranteed and can be purchased direct from SLOGGER or through certain dealers. The demand for this computer has prompted SLOGGER to offer both the TURBO ELECTRON and the 64K ELECTRON as well as the standard 32K ELECTRON.

32K Electron	ONLY 84.00
TURBO Electron (switchable)	85.00
64K Electron (switchable)	99.00

GREEN SCREEN MONITORS

SLOGGER has on offer a limited quantity of Green Screen monitors. These monitors are ideal for Word Processing in 80 column mode giving good clear consistent text. A MUST for VIEW or STARWORD users. Complete with all cables suitable for the Acorn Electron computer (or BBC). Fully tested £90.00 inc carriage

MASTER RAM BOARD

Upgrade your Electron to a 64K Machine using 32K of SHADOW RAM

- Fits inside the Acorn Electron, uses no cartridge ports.
 - Compatible with ALL reliable Electron hardware (except TURBO DRIVER).
 - Compatible with ALL Electron software, switching between 64K mode, TURBO mode (yes... the TURBO DRIVER IS BUILT IN), and normal mode.
 - For correctly written software, HIMEM IS ALWAYS AT 8000 in 64K mode so leaving 28000 bytes for BASIC or WORD PROCESSING in ALL screen modes.
 - Doubles the speed of Word Processing.
 - Up to 300% speed increase for games.
 - Additional 12K for use as Printer Buffer with Expansion ROM 2.0.
 - Installation Service for those not confident of soldering.
- NEW FEATURES**
- 64K Mode fully compatible with 98% of Level 9 BBC Adventure games.
 - NEW OS 2.1 - PLAY ACORN'S ELITE WITH SLOGGERS JOYSTICK INTERFACE.

"I can thoroughly recommend it"

Electron User 1987

Master RAM Board Kit - code MR2 - Now Only £49.95

Parcel Post
Amount of
postage to be
paid by
Scanlon

Postage Forward Parcel
Service
Licence no. GUC1

No postage
stamp
necessary
unless posted in
Channel Islands
Isle of Man or
Republic of
Ireland

Date stamp

SLOGGER LTD
107 RICHMOND ROAD
GILLINGHAM
KENT
ME7 1BR

SEDS

THE COMPLETE DISK SYSTEM UPGRADE

Imagine... 400K of memory instantly available...
Games loaded in seconds...
Word Processing files loaded or saved in seconds...
BASIC programs loaded or saved in seconds!!!
This is the power of the disk system.

Requiring either the ROMBOX PLUS or the ACORN PLUS 1, SEDS is comprised of the following:

- High quality 40/80 switchable double sided 5.25" BBC compatible drive with built in power supply unit.
- The Slogger Electron Disk Interface (SEDI)
- The Slogger Electron Disk Filing System (SEDFS).

SEDS ONLY £199.95

SEDI

SLOGGER ELECTRON DISK INTERFACE.

This unit fits into the ROMBOX PLUS or ACORN PLUS 1 and provides the signals to control any standard 5.25" or 3.5" inch drive. Supplied complete with SEDFS installed with appropriate documentation.

SEDI ONLY £74.95

SEDFS

SLOGGER ELECTRON DISK FILING SYSTEM

- FULLY ACORNFDS compatible
- OSWORD 7D, 7E and 7F implementation
- FORMAT and VERIFY and other utilities built in
- Page E00... NO LOSS OF ELECTRON MEMORY
- OPT commands for faster drives
- FULLY compatible with BASIC Filing system commands
- FULLY compatible with machine code programs
- TAPE to DISK available (T2SEDFS)
- Excellent comprehensive 90 page documentation.

"SEDFS is so good that I can't easily find fault with it, the manual is quite simply the best of the type I have seen, to suit everyone from the beginner to the professional"

"The SEDFS performed admirably throughout..."

"Anyone considering upgrading disks, SEDFS is the logical choice"

"I can recommend SEDFS unreservedly"

Electron User June 1987

THE ELK TURBO DRIVER

(Designed by Andyk Ltd.)

RUNS ELECTRON SOFTWARE AT SPEEDS COMPARABLE TO THE BBC

- Doubles the speed of Word Processing
- Up to 300% speed increase for games
- Fitted internally - occupies no cartridge ports.
- Switchable "Normal/Turbo" speed.
- Compatible with ALL existing hardware and software products (except the Master RAM Board).
- Installation Service - for those not confident of soldering.

"This upgrade should be standard on all Electrons"

Electron User July 1986

Turbo Driver Kit - code TD2 - Only £29.95

INSTALLATION SERVICE

- Guaranteed to upgrade your Electron with either the Master RAM Board or Elk Turbo Driver AND RETURN IT WITHIN 7 DAYS OF RECEIPT.
- Includes Postage paid BOTH WAYS (using FREEPOST) and 1 YEARS GUARANTEE.

Order MR1 - Master RAM Board Installed - only £59.95
or TD1 - Elk Turbo Driver Installed - only £39.95

Please note... if you own a PLUS 1, please send it with your Electron to be tested to ensure reliability at high speed.

ROMBOX PLUS

SLOGGER's answer to the PLUS 1

Q. Why not buy the Acorn Plus 1?

A. Because "Excellent though the Plus 1 is, I think there is still room for improvement" said the Electron User Magazine.

The ROMBOX PLUS has this improved specification:

1. Four ROM/RAM sockets to free the cartridge slots for more important add-ons. Each socket can take the usual 8K/16K ROMs but can also take 16K RAMs offering a staggering 64K SIDEWAYS RAM.
2. The PLUS1 Cartridge slots.
3. The PLUS1 centronics printer port.
4. The Expansion ROM 2.0
5. Switched Joystick interface available.
6. Analogue Joystick interface under development.

Still Only £54.95

ACORN PLUS1s

Slogger has on offer a limited number of Acorn PLUS1s. These units are brand new but nonetheless fully tested in Sloggers factory.

ONLY £44.95

(£50.00 WITH EXP ROM 2.0)

TAPE TO DISK ROMS VERSION 2

- Transfer the majority of Tape programs to disk
- Acornsoft, Superior and Micropower no problem
- Compatible with programs copied using Version 1
- More successful than ever before

T2PS for the Acorn Plus 3
T2CU for the Cumana DFS
T2P4 for AP4 and EDO DFS
T2SD for the Solidisk DFS
T2SEDFS for the SEDFS

ONLY £24.95

- Upgrade 1-2 only £5 with original ROM

NEW PRODUCT

PRINTER AMSTRAD DMP 3160

- A new, super fast printer now available to Electron Users
 - Fully EPSON and IBM compatible
 - New prints 160 characters per second
 - Ideal for listings, Near Letter Quality for Word Processing
 - Excellent for graphical
 - FREE lead for ROMBOX PLUS or PLUS 1
- Release price £199.95

JOYSTICK INTERFACE

for ROMBOX PLUS or ACORN PLUS 1

- Uses cheap ATARI-type joysticks
 - Compatible with ALL Tape and Disk systems.
 - Emulation of keys by Expansion ROM 2.0
 - Can be used with well written games either WITH or WITHOUT A JOYSTICK OPTION
- "The ultimate Joystick Interface"

A&B July 87

"Well worth saving up for, I can recommend it to all Arcade Addicts"

Electron User May 87

Only £14.95

- Requires Electron Expansion 2.0
- Only £5 with this unit

JOYSTICKS

Switched Joysticks for the Slogger Joystick Interface
Quickshot I £4.00
Quickshot II £5.00

SLOGGER EPROM CARTRIDGE

- Carries TWO 8K/16K ROM/EPROM software
 - Compatible with PLUS 1, ROMBOX PLUS and BBC Master.
 - Simply plugs into cartridge slot
- £10.00 for a limited period

ROM SOFTWARE

STARSTORE 2 £29.95
SEDFS upgrade ROM for CUMANA owners £24.95

* BARGAIN CORNER *

STARSTORE £9.95
STARMON £9.95
STARGRAPH £9.95
PRINTER ROM £9.95
STAR TREK £9.95
ELKMAN £9.95
PDG £9.95
STARWORD 19.95

OTHER PRODUCTS

5.25" 40/80 Track D/S disk drive inc. PSU £149.00
3.5" 40/80 Track D/S disk drive inc. PSU £149.00
Printer Lead (for ROMBOX PLUS/PLUS 1) £9.95
Electron Advanced User Guide £9.95
Vine Micros ADDCOMM £29.00
Vine Micros MATRIX ROM £36.00
USER PORT for any DIGITAL MOUSE £29.95
Cassette leads £2.95
Electron PSU £14.95
PLUS 3 PSU £24.95
Acorn Data Recorders £24.95

ALL ACORN SPARES NOW IN STOCK

All prices include VAT & P&P UK Mainland only

Expiry Date	PLEASE SUPPLY	Cost
1	Access No	£
2	Via	£
3	Name	£
4	Address	£
5		£
	Total	£

Please send orders to SLOGGER LTD, 107 RICHMOND ROAD, GILLINGHAM, KENT

32K SIDEWAYS RAM CARTRIDGE

for ROMBOX PLUS or PLUS 1

- Ever popular on the BBC
- Best used with EXP ROM 2.0
- (1) Save ROM backups for loading into Sideways Ram
- (2) Set up a 16k Print Buffer
- Splits as 2x16k pages
- VIEW and VIEW-SHEET in one slot!!
- Write protect option ... prevents corruption of software.

"A very powerful piece of hardware"

Electron User July 87

ONLY £34.50

(£39.50 with EXP ROM 2.0)

EXPANSION ROM 2.0

for ROMBOX PLUS or PLUS 1

- Supports Printer Buffer with 8K/16K sideways RAM or 12K with MASTER RAM BOARD.
- RSAVE command to save ROM Images to tape or disc.
- RLOAD command to load Sideways RAM with a ROM image.
- ROMS command to displays ROM/RAM in system.
- JOYSTICK command for the SLOGGER Joystick Interface.
- Allows cassette loading in high resolution.
- Supports all standard functions (Printer, ADC, RS423)
- Simply fits into internal ROM socket.
- There is room for improvement in the operating system. No doubt this was the idea behind Expansion 2"

Electron User, July 87

Only £11.95

(£5 if purchased with 32K SIDEWAYS RAM or JOYSTICK INTERFACE)

SLOGGER'S AUTHORISED DEALERS

Aberdeen Micro Logic	0509 66233
Birmingham Allen James Computers	021 778 5737
Bristol Aven Computer Exchange	0272 637981
Bristol Atomic Computer Systems	0292 54299
Sylkei Calantrati	0632 342137
Cardiff Computer Exchange	0222 483069
Cardigan Cardigan Electronics	0239 614483
Chesham Reads Photo & Computing	0494 783373
Croydon Computer Centre	01 683 2646
Farnham Project Expansions	0329 221 109
Farnham Farnham Computers	0252 723107
Glasgow Computer Depot	041 332 3944
Leicester DA Computers	0533 549407
London Compulace	01 580 0181
Luton Hobbys	0562 467 185
Market Harborough Harborough Computers	0539 630556
Newbury M&S Associates	0335 45774
Oldham Home And Business	061 633 1608
Sharnbrook Swalesat Systems	0795 665530
Stockport Dram Electronics	061 429 0626
Telford A1 Computer Supplies	0952 502737
Trowbridge West Wilt Micros	0214 62758
Ulverston Skand Computers	0229 56984
Warrington Cheshire Micros	0925 414109
Netherlands Velobyte Computers Rotterdam	010 4138137
Mail Order Only	
Milton Keynes Towerhill	0908 74246
Netherlands Computers	31 10 436 18 00
Stockport 21st Software	0625 528885



SLOGGER

Tel: 0634 52303

SEND
FOR
THEM
TODAY

Cheques payable to
SLOGGER LTD

☐ Access No
☐ Visa
Name
Address

LOGO is a fairly new language, less than 10 years old, developed by Seymour Papert, a mathematics professor at the Massachusetts Institute of Technology.

He investigated how children learn and how computers could help them. Logo was intended to provide the ideal learning environment.

It has been, and still is in widely used in schools, particularly in primary education where children are taught simple geometry through using a turtle or buggy combined with Logo's simple turtle graphics commands.

Unfortunately the educational history of Logo's development has had the effect of labelling the language a child's toy.

Most people are only aware of the turtle graphics side of the language, and this tends to strengthen the misapprehension.

It is far from being a toy and is in fact a powerful programming language which has many applications as we'll see in this short series.

With the exception of turtle graphics, Logo is far from easy to learn and is probably more difficult to get to grips with than Basic.

Some aspects of the language are similar to Lisp, so if you've been following this series you should recognise some of the list processing commands.

I'm going to start on familiar territory by first looking at turtle graphics. Once this is out of the way we can concentrate on the more unusual and little known aspects of Logo.

There is only one full implementation of Logo for the Electron - the Acornsoft rom cartridge. This is currently selling for less than £30 and comes complete with two thick manuals.

Alternatively, a cut down version comprising the turtle graphics commands is available from Acornsoft and is a good introduction to the language. It sells for under £3 and comes on cassette.

If you don't mind typing

Turtle graphics

ROLAND WADDILOVE introduces the programming language Logo

you'll find a Logo lookalike called Pogo in the December 1986 and January 1987 issues of *Electron User*.

For this article I'll assume you have Turtle Graphics up and running and are sitting at your Electron ready to type in the examples.

Like Basic, Logo uses a text window to display text output and a graphics window for graphics. The startup screen is a SPLIT-SCREEN with a graphics window at the top and text window at the bottom.

There's also a TEXT-SCREEN for displaying text only and a FULLSCREEN for graphics only. To see these enter:

```
TEXTSCREEN  
FULLSCREEN
```

and finally, typing "blind":

```
SPLITSCREEN
```

You can't see what you're typing after entering FULLSCREEN because it's designed for graphics only. SPLITSCREEN however, restores everything to its initial state.

This screen is useful for entering direct commands and watching their effects as we'll see. Shortly, we'll use a TEXTSCREEN to enter and edit a procedure.

Let's try a few of Logo's



simple turtle graphics commands. Enter:

```
FORWARD 200
```

and you'll see the turtle (represented by the triangle in the centre of the screen) move forward 200 units leaving a trail behind it.

The turtle's units are the same size as the graphics units you're used to in Basic and the screen is 1280 units wide and 1024 high.

Now turn the turtle with:

```
LEFT 90
```

and follow it with another:

```
FORWARD 200
```

The 90 is the number of degrees to turn and the LEFT is which way - left or right. We can turn the turtle trail into a square with:

```
LEFT 90  
FORWARD 200  
LEFT 90  
FORWARD 200  
LEFT 90
```

We can just as easily draw a triangle. First clear the screen with CLEAR and then type:

```
FORWARD 200  
LEFT 120  
FORWARD 200  
LEFT 120  
FORWARD 200  
LEFT 120
```

Notice this time we turned through 120 degrees each time. There are 360 degrees in a circle so if we turn through a total of 360 degrees we'll end up facing the way we were at the start.

To draw a three sided polygon (a triangle) we turn through 360/3 or 120 degrees each time we draw a side. To draw a four sided polygon (a square) it's 360/4 or 90. A pentagon has five sides so we could draw one by entering:

```
FORWARD 200  
LEFT 72
```

five times (72 is 360/5). Try it and see - clear the screen with CLEAR first though.

You now know how to draw any polygon. Simply divide 360 degrees by the number of sides and turn that number of degrees each time you draw a side.

You must have noticed by now, how repetitive the commands are. What we've been doing is repeatedly telling the turtle to go forward 200 units and turn left a set number of degrees, many times.

Naturally, there is a REPEAT command in Logo which enables us to repeat a section of code. To use it

however, we'll need to define a procedure. This means using the built-in text editor.

We'll use the TEXT-SCREEN to define the procedure so enter:

TEXTSCREEN

Now tell Logo we want to define a procedure with:

TO SQUARE

and the message "Type M for Menu or type an edit command" followed by "Add lines" appears. Forget the menu, Logo is waiting for you to enter the procedure definition. Here it is:

```
SPLITSCEEN
REPEAT 4
  FORWARD 200
  LEFT 90
ENDLOOP
```

We tell Logo we've finished by typing:

STOP

and the M for Menu message appears. Press M now to see the editor's commands.

Tap the L key and you'll see the procedure you've just defined listed on the screen, it should look like Figure 1. If there are any errors, use the replace line command to enter the offending line again.

Assuming all is well, press E to end the editing session. Now we can test our procedure. Type:

SQUARE

and you should see the turtle draw a square. Logo repeats the section of program between the REPEAT and ENDLOOP markers four times - the number immediately following the REPEAT command.

If we wanted to draw a hexagon - a six sided polygon we would repeat the loop six times and the angle to turn left each time would be 60 degrees (360/6).

If you have followed everything so far, try defining another procedure called BOX and in place of FORWARD enter BACK instead, and replace LEFT with RIGHT. After defining

it, enter BOX to run it.

What we've got is a procedure that draws a square of fixed size. It would be nice if we could draw it any size we want.

Change to the TEXT-SCREEN and type LIST to see what procedures have been defined - there should be two, SQUARE and BOX. Delete them with:

```
ERASE SQUARE
ERASE BOX
```

or alternatively use NEW to clear the memory. Define a new procedure called rectangle:

TO RECTANGLE width,height

The two variables *width* and *height* are two parameters we are going to pass to the procedure. The main body of the definition is:

```
REPEAT 2
  FORWARD width
  LEFT 90
  FORWARD height
  LEFT 90
ENDLOOP
STOP
```

Remember the STOP ends the procedure definition and doesn't mean stop the program.

To test this enter:

```
SPLITSCEEN
RECTANGLE 100,500
```

If you have entered it correctly you should see a

```
Type:
A to Add lines
L to List procedure
D to Delete a line
I to Insert a line
R to Replace a line
C to Change the identifier list
E to End edit
```

```
List procedure
PATTERN 4
None
PATTERN 3
None
1 SPLITSCEEN
2 REPEAT 4
3 FORWARD 200
4 LEFT 90
5 ENDLOOP
6 STOP
```

Type M for Menu or type an edit command

Figure 1: The editing screen

large rectangle drawn on the screen. We'll embed this definition within another and use it to generate a pattern.

Change to the TEXT-SCREEN and enter:

```
TO PATTERN steps
SPEED 255
SPLITSCEEN
REPEAT steps
  RIGHT 360/steps
  RECTANGLE 300,100
ENDLOOP
STOP
```

This defines a procedure called PATTERN which takes one parameter, *steps*. The first command, SPEED sets the speed of the turtle to fast - it ranges from 1, slow to 255, fast.

Notice the REPEAT loop is dependent on the parameter *steps*, and the angle to turn is an arithmetic expression.

RECTANGLE is called from within the REPEAT loop.

Test this new procedure with:

```
PATTERN 4
PATTERN 30
HIDETURTLE
PATTERN 60
```

and see what happens. Here is a spiral pattern using the rectangle procedure again, enter:

```
TO SPIRAL
SPLITSCEEN
HIDETURTLE
SPEED 255
x:=400
y:=300
REPEAT
  WHILE y>10
    RECTANGLE x,y
    x:=x-10
    y:=y-10
  RIGHT 10
ENDLOOP
STOP
```

In this, two variables *x* and *y* are used. Note that := is used to assign a value to them and not = as in Basic.

The REPEAT loop is different in that it isn't repeated a set number of times, but loops WHILE *y* is greater than 10.

To see what procedures you've got in memory switch to the TEXTSCREEN and type LIST. To see a particular procedure definition follow LIST with its name. To change it type EDIT followed by the procedure name.

● That's all for now. Next month we'll leave turtle graphics behind and look at the rest of the Logo programming language using the rom cartridge.

BACK number	PENERASE
CLEAR	PENUP
COLOUR number	PRINT number/text
EDIT procedure	RAND variable
ERASE procedure	REPEAT
ENDIF	REPEAT number
ENDLOOP	RETRIEVE name
ENVELOPE n,n,n...	RIGHT number
FILL	SAVE name
FORWARD number	SETTURTLE n,n,n
FULLSCREEN	SHOWTURTLE
GET	SOUND n,n,n,n
HIDETURTLE	SPEED number
HOME	SPLITSCEEN
IF expression	TEXTSCREEN
LIST	TO name
LIST procedure	TURTLESTATE n,n,n
LEFT number	UNTIL expression
MODE number	VDU n,n,n...
NEW	WHILE expression
PENDOWN	

Table 1: Turtle Graphics commands

electron user ARCADE CORNER

What can you say about computer games? Almost everyone has a particular favourite, whether as five minutes relaxation after a hard day's wordprocessing, or as a full-scale obsession. Hands up those of you still playing Elite!

Of course, no matter how good your favourite game may be, it is never configured precisely to your taste – it may be too easy or too hard. It is possible, however, to tailor it to your ideal requirements.

Compilations – without doubt the flavour of the year – give ample scope for tinkering. The Superior Collection is one of the best. It consists of seven favourite Superior Software oldies, together with a previously unreleased game.

This month we feature cheats and pokes for Smash and Grab, Deathstar, Mr Wiz and Overdrive – four of the games contained in this collection.

Share your hints, tips, peeks and pokes with fellow *Electron User* arcade addicts (but please ensure they are all your own work). Send them too

ArCADE CORNER
Electron User
68, Chester Road
Hazel Grove
Stockport
SK7 5NY

Deathstar – Superior Software

Deathstar is a conversion of the arcade game Sinistar where you are the pilot of a solitary mining spaceship in search of crystals.

Shoot the planetoids to release them, then scoop them up. Once collected they act as bombs.

Competing with you are the Worker ships which use the crystals to assemble, piece by piece, the dreaded Deathstar.

Defending these Workers are Warrior ships that shoot at you at the slightest provocation.

To make yourself invulnerable to the bullets of the Warrior ships, enter the following:

```
PAGE=83000  
LOAD'DEATH'  
155 END  
RUN
```

Put the tape in the tape recorder and press Play. Wait until the files DEATH1 and DEATH2

have loaded, then type:

```
LOAD'DEATH3'  
8 ?81397=0: ?81A21=0  
RUN
```

You can give yourself a little more breathing time with:

```
8 161386=0: ?81B73=0
```

This causes the Deathstar to be rebuilt from scratch every time it kills you.

The two sets of pokes can, of course, be combined as a single line.

Smash and Grab – Superior Software

Smash and Grab is a basic platforms and ladders game, and one that teaches very bad habits.

You are a bank robber out to get rich quick by collecting the bags of gold falling from a bank's broken window.

In your way stands the local bastion of the law, but beware, he's mean.

Not only can he run faster than you, but he also has a nasty habit of

jabbing you from below or bopping you on the head from above with his truncheon.

As attack is always the best form of defence, wait until a police box starts to flash, then kick it.

This gives you a limited period of invulnerability. You can then attack the policeman and knock him into the water

I'm not sure it's altogether acceptable to go around assaulting policemen, but it's a fun game anyway.

It is however, somewhat marred by being extremely slow – none of the fast, smooth action you would expect from a fairly recent release.

As the game stands, you start on level zero with three lives. To start on level one with an extra life enter the following:

```
PAGE=85000  
LOAD'SMASH2'  
675 ?814F3=1  
RUN
```


Overdrive – Superior Software

Overdrive is unfortunately a classic example of a game showing its age. You control a motor racing car driving through a series of stages, including desert and night drives.

Seemingly out to get you are a number of other competitors whose driving makes Parisian taxis seem tame.

Sadly, Overdrive falls short of what both Peter Johnson and the Electron are capable of, though in its time it was considered

to be an excellent game. For those struggling, you can make the game easier by entering the following:

```
PAGE=62300
LOAD"OVER2"
210 IF ?BONUS>20 THEN ?STA
GE=?STAGES+1:GOTO 150
RUN
```

The sound envelopes will be lost, but you now need to pass only 20 cars to be promoted to the next stage.

By all means change line 210 – the qualifying limit can be anywhere between one and 50.

Psycastris – Audiogenic

To activate Psycastris's built-in cheat, wait until the second file, PSYCAS-TRIA, has almost finished loading and then hold down the Shift key.

After a few seconds, the computer will bleep at you and print the message "CHEAT PRIMED!". Release Shift and wait until the game has fin-

ished loading.

On the title page, press down the keys I, L, T, D and N together. The program will then ask you for a password: Type IN SHOTOKAN. When you play the game you will have 123 lives instead of the usual three.

After each game the program reverts to normal, so enter the password again to cheat next time round.

Mr Wiz – Superior Software

Mr Wiz is a version of the arcade favourite, Mr Do, a game that has robbed me of more 10p pieces than I care to count. You are a wizard who must run around the garden collecting cherries.

The garden is also inhabited by a number of hungry creatures who like nothing better for lunch than a tasty bit of wizard.

By careful timing you can squash them under the numerous giant apples. Life isn't so easy though and they have a habit of avoiding your carefully laid traps, so it's a good job you remembered your trusty crystal ball which you can throw at them.

Unfortunately, Mr Wiz does not stand up too well beside Mr EE from Micro Power, but that title is sadly only available for the BBC Micro.

To start on a higher level in Mr Wiz (up to 99) or have extra lives (up to 41) enter the following:

```
PAGE=62100
LOAD"GAME"
12 QX=5402:EX=5495:MX=5638:
LX=6947:RX=5952
125 !41406=start level:241
48A=no of lives
RUN
```

Unfortunately, the sound envelopes will be lost, but the extra versatility should make up for this.

Sphere of Destiny – Audiogenic

Gary Partis' games, Sphere of Destiny and Psycastris have built-in cheats. To activate Sphere of Destiny's, wait until the game has finished loading, and then press the 0 key.

In response to the computer's prompt, enter the password LAZON-NOMORE. The black holes will be filled in white making the game considerably easier. Pressing J will advance you to the next level.

After each game the program reverts to normal, so enter the password again to cheat next time round. Thanks to Justin Condon from County Dublin and Paul Sanderson from Chesterfield for this excellent tip.

ADVANCED CONTROL PANEL

(30M)E/C

£34.50

ACP is a front end control panel language providing a sophisticated yet friendly interface between user and computer for access to Languages, MOS functions, and the users own file utility etc. Main features include pull down windows, simple to change MOS configure, floating point calculator, file manager, SWROMs facilities.

(16K EPROM + FULL MANUAL)

Advanced Computer Products

ADVANCED 25 MEG RAM

£79.95

(19) (MAD)E+1(ADE)

New Hi-tech cartridge (normal size) containing an incredible 256k of 5 ways RAM although it could be used to store many pages of 5 ways caps ROM images its primary and best use is as a Caps RAM Disc supported by our advanced 1770DFS (Master/Adm or Electron ADE are now upgraded to access the 256k in AOR. Now databases (i.e. Viewstore) can perform at breathtaking speed (over twice as fast as some other 1 Meg Silicon Discs) and animation with up to 25 screens becomes a reality. Price must reflect real value for money and package prices for AOR and ADM/E are available at £99.95 (existing ROMS may be upgraded when purchasing AOR for £5

ADVANCED DISC TOOLKIT

(01) /M/B/E/C

£34.50

Any Acorn user including Master, BBC B+, Electron, DFS, 1770 DFS, ADFS, 2nd. & co-processors A.C.P.'s BEST SELLING product containing over 30 commands inc. - powerful memory & disc editor, search memory/disc/basic, catalogue/unplug ROMs, load/run programs below page, automatic menu, file transfer (inc. locked cassette files), ADFS units etc. etc. ("it's superb" - Database Pubs. "A top-class toolkit - I have no hesitation in recommending it. Acorn User Nov 86)

(16K EPROM + FULL MANUAL)

ADVANCED ROM ADAPTOR 2

(03) /M/E+1/

£14.95

An Acorn approved cartridge containing a card with special zero profile sockets that allow you to fit compatible 8K or 16K EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use - no switching - complies fully to the Acorn (sideways) Rom Filing System. A.R.A. 2 contains 2 sockets. A.R.A.1 (02)/E/ £10.35 "The best Rom cartridge is by far the ACP ARA 2" - A+B Dec 86

ADVANCED BATTERY BACKED RAM

(18) M/E+1

£29.99

For Master and Electron users. A battery backed 32K RAM cartridge A.B.R. is a self contained cartridge containing two 16k pages of sideways RAM with a rechargeable battery back up. Each 16k page can be individually locked by software. Supplied with full software support, to include loading software, ROM save, advanced print buffer and a disc utility MAKEROM. "It's a superb Addon and a must for all serious Electron Users" EU June

ADVANCED ELECTRON DFS

(06) /E/

£24.15

Electron & Plus 3 users gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. A.C.P. also supplies 5 1/4" disc drives to add to your Plus 3 (inc 2nd drive adaptor). "ACP has produced another superb ROM for the Electron". Electron User Feb 86

(supplied on 16K EPROM + DFS MANUAL)

ADVANCED DISC INVESTIGATOR

(06) /M/B/E/C

£28.75

A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40track discs to 80track discs, verify two non-standard discs ("ADI features an extremely comprehensive sector editor, and one of the finest I've seen" TubeLink (Partial) (supplied on 16K EPROM + manual)

ADVANCED SIDEWAYS RAM

(04) /E+1/

£29.90

A highly versatile but simple to use s/w RAM cartridge that is automatically write protected on loading. Contains 16K RAM but can be switched (externally) to 2 x 8K RAM. Supplied with instructions & full software support (on cassette) to save ROM images to disc, to load RAM from file, Advanced Print Buffer & MakeROM a utility to merge several files from disc to be run from the ROM FS (S/Ware on disc please add £1 5 1/4 DFS £2 3 1/4 ADFS)

ADVANCED PLUS 4

(08) /E+1/

£79.90

DISC DRIVE COMPATIBILITY AT LONG LAST (Electron User June 86) this sums up A.P.A. & ACP's approach to producing products. A.P.A. is a fully ACORN compatible disc i/face & will accept any standard drive inc. PSU, runs 1770 DFS (as fitted in the B+ & Master), keeps page & file info in ROM & provides a spare rom socket. ACP's PLUS 4 comes out on top. I recommend it to anyone. (EU June 86)

A.P.A. should be considered the standard interface for the Electron (AU July 86)

AP4 100 £199.00 (inc VAT & Securitor delivery)
AP4 400 £229.00 (inc VAT & Securitor delivery)

ADVANCED PLUS 5

(09) /E+1/

£86.70

A triple interface cartridge providing 1) a TUBE i/face allowing a second processor to be connected, increasing BOTH speed & memory i/PAGE & B&E HIMEM & B&E in all modes) 2) a 1 MHz BUS for control applications & prommers 3) the USER PORT for mouse and graphic devices Also contains 2/3 ROM sockets and on board operating software for 2nd processor

ADVANCED 1770 DFS

3 versions ADM/C(11) - ADB(12)

ADE (13)

£34.50

ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of a disc (B40K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC.

(16K EPROM + comprehensive manual)

NEW EXCLUSIVE PRODUCT ELECTRON ASSEMBLY LANGUAGE

Book by Bruce Smith ONLY £2.95 (144)

Software for above book on 3 1/2" A.D.F.S £3.50 (145) or 5 1/4" D.F.S. £2.50 (146)

OTHER PRODUCTS & SPECIAL OFFERS

VIEW cartridge	(101) /E+1/ £ 14.95	3 1/4" discs in 1/box	(120) /M/B/E/ £24.00
Vsheet	(102) /E+1/ £ 14.95	5 1/4" discs dd/dd	(121) /M/B/E/ £129.00
VIEW & SHEET	(119) /E+1/ £ 22.00	5 1/4" discs ss/ss	(122) /M/B/E/ £129.00
LISP cartridge	(103) /E+1/ £ 9.99	3 1/2" disc drives	(104) /E/ £ 8.98
E/Adv User Guide	(104) /E/ £ 3.95	5 1/4" disc drives	(105) /E/ £149.00
LOGO cartridge	(106) /E/ £ 29.95	2nd Drive Adaptor	(130) /E+3/ £ 7.95
PASCAL cartridge	(107) /E/ £ 29.95	Compact 2nd Drive Adaptor	(144)/C/ £14.95
VIEW pack BBC	(118) /B/ £ 49.00	3 1/2" library box 10	(124) /E/ £ 2.95
AP4 100	(140) /E+1/ £199.00	16K EPROMS	(117) /M/B/ £ 5.75
AP4 400	(141) /E+1/ £229.00	VIEWSTORE	(117) /M/B/ £57.95
AP5 + MOUSE Package	(143) /E+1/ £125.00	Plus	VE £49.95

ADVANCED ELECTRON DFS E&S

(14) /E+ASR/

£19.99

An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system & S&E when using the Plus 3 (in ADFS page would normally be & I Deel). The DFS is simply loaded using the software supplied with the ASR from disc. Optional upgrade for existing AED users £9.50 on return of original EPROM. (3 1/2" ADFS disc + manual)

Equipment codes /M/=Master /B/=BBC /E/=Electron /E+1/=Electron+Plus1 /C/=Compact

Please send order to:
Advanced Computer Products Ltd.
6 Awa House, High Street
CHOBHAM, Surrey, England
GU24 8LZ Tel 0276 76545
(mail order only)
All our prices include
UK delivery & VAT

NAME

ADDRESS

POSTCODE

TEL

CREDIT CARD No

PROD
NO

PRODUCT

QTY

@

TOTAL

I enclose payment for £

Exp date (Ref E29)

Micro Messages

The Electron's role in education

THANK you for Nic Outterside's new series on the Electron in education. As the school's resident expert it has been my job to guide the school through the last three years, and this term, to replace our Electrons with the BBC Micro.

With all due respect to Nic, he has only stated half of the problem. True educational software stockists are few and far between (but what's wrong with buying direct anyway?).

The main problem, which we all know but are loath to admit, is the Electron's lack of memory.

From the very beginning, the usual gripe was "But it doesn't have Mode 7". As most companies wrote their programs in Mode 7, this cut the Electron user off from a vast source of quality software.

Knowing this, I recommend the Electron on the basis chiefly of cost to our parents.

Hitherto the teacher such as myself faced by this question had two choices. Option one is said at normal speed: "Well, you can buy an Electron for about £80 and a tape recorder for another £30, but you won't be able to buy some of the better BBC software". You then walk away.

Option two is said rather more quickly: "Well, you can get the BBC Micro and it'll cost you at least £300, that's without a tape recorder or disc drive or software".

Having delivered this well measured discourse you run like hell before the parents have worked out what this will all cost them.

With the recent addition of Mode 7 emulators the Electron has now come back into its own. It is now possible to run BBC software on a machine which has cost no more than £200.

This is surely where the

Electron's future lies. - Chris Price, Sidcup, Kent.

● We always emphasise that no matter what you add to an Electron it will never be a BBC Micro. The Electron is a totally different computer, and it is amazing that it runs any BBC software at all.

You can save programs on an Electron disc, put it in an Archimedes, load and run them. Try running Spectrum software on Sinclair's latest Z88, or Atari 800 software on a Mega ST or... the list could go on.

Techniques learnt on the humble Electron will stand you in good stead when moving on to a much more powerful micro such as a Master Compact or Archimedes. No other micro (or company) provides this degree of compatibility.

The lack of memory can be solved by adding Slogger's Master Ram Board (reviewed in the January 1987 issue of *Electron User*) or a PMS second processor (reviewed in the October 1986 issue).

The lack of Mode 7 can be

overcome with Jafa Systems' Mode 7 adapter (reviewed in the August 1987 issue).

As to the software problem, how about asking some of the older students to write educational software for the younger pupils lower down in the school?

It could easily become a useful project for A level students, and it will benefit the school and parents as well.

In shadow mode

IN the August 1987 issue of *Electron User* a letter by Adrian Trout highlighted the problems of accessing screen memory using Slogger's Master Ram Board in shadow mode.

The solution you printed is fine for saving screen memory to disc, but is rather slow - even when converted to machine code this is still the case.

Several of my programs use pull down menus that

require the screen memory to be accessed both directly and quickly. I thought I had the answer when I discovered that writing a one to location &FC7F paged out the shadow memory.

As well as doing this however, all memory below &3000 was paged out also, so the stack and zero page vanished.

It is possible to write a machine code program using this technique, but the resultant program is very inelegant and since all memory between 0 and &7FFF is paged out, the program must reside above &8000 that is, in sideways ram.

Hot on the heels of this discovery I noticed that changing from shadow to turbo modes paged out memory above &3000 and only this memory - just what was needed.

However, this meant my programs contained messages like "Switch to Turbo mode" and so on. If this method is used the program to do the saving must be in machine code and must reside below &3000 since the Basic stack is paged out.

In my quest for the ultimate solution I realised that automatic operation of the mode switch was called for. Of the three wires going to the mode switch the centre one carries +5V while the others are:

● Normal, shadow or turbo mode select. When this line is at +5V normal mode is selected. Disconnected, shadow or turbo mode is selected.

● Shadow or turbo mode

BUSY AS A BEE

Computing's my main aim in life,
Not being a chef with a carving knife,
Or down in the pits, mining for coal,
Or wandering around, 'cause I'm on the dole.

It's a busy life at the keyboard,
By the memory, where programs are stored,
So much to try, so much to do,
There's hardly time to nip to the loo!

When at last your fingers grow tired,
You pull out the plug, the Electron's unwired,
It's time to get a good night's rest,
Dreading tomorrow's computer test.

Neil Parrish, (age 12), Bessacarr, Doncaster.

Turn to Page 48 ▶

select: When this line is at +5V, Turbo mode is selected. Disconnected, shadow mode is selected. Note that "disconnected" is really 0V due to pulldown resistors on the board.

Therefore all that is required is an output port with one bit connected to shadow/turbo select. If bit one is used, writing one to the port will select turbo mode, writing zero will select shadow mode.

It has occurred to me however, that since most Master Ram Board users will also be disc users, at least when using shadow mode, then the cassette relay could be used instead.

This would have to take into account contact bounce — employ a short delay after switching before any memory is accessed, and also have a manual override to allow turbo mode to be selected for games when the cassette interface is being used.

Another alternative would be to use one of the outputs from port A of a 6522 VIA available on most user port add-ons. I think Slogger should have had this form of mode selection rather than the switch.

While on the subject of the Master Ram Board I have found a minor bug in its operating system. When an OSCI command string is in memory above &3000 and parameters are required, a Bad command error is produced. This only applies to inbuilt commands, not for instance, to DFS commands.

I have quite an early Master Ram Board, the os being version 2.00 so the bug may have been cured by now. Apart from this I consider the Master Ram Board to be the best add-on available for the Electron bar none. — Brian Ross, Glasgow.

● We have a Master Ram Board fitted with version 2.00 of the operating system, but were unable to reproduce the error messages you describe.

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

Literate leanings

I WELCOME the appearance of the new feature Arcade Corner, but at the same time the argument of your correspondent Tim Walter may not be as soundly based as all that.

The point is not how popular arcade games are in general as compared with adventures, but how they are ranked by readers of the magazine. This isn't the same thing.

My guess would be that the more literate a person is, the more he reads, the more likely he is to lean towards adventures. But I am willing to be proved wrong. — Bill Trevelyan, Epsom, Surrey.

● In our experience this simply isn't true. The editor, for instance, likes nothing better than a good school-'em-up and hasn't the patience to play an adventure.

All top programmers are extremely clever, literate people, yet they mostly write arcade games, not adventures.

Apostrophe catastrophe

I ENJOY typing in the listings and attempting to make them work (what a feeling when they do!). Unfortunately, I am now over 40 and my eyesight is not as good as it was and certain

aspects of your listings are beginning to cause difficulty.

I find it impossible to distinguish between inverted commas and apostrophes. As an example, take line 2580 in the Lemonade Stall listing in the September 1987 issue of Electron User. I cannot get the right combination to run the program.

Perhaps wide gaps between apostrophes might solve the problem. Whatever it is, please let me have the correct line for 2580. — Peter Crawford, Ferryhill, Co Durham.

● This is quite a difficult line to understand because of the large numbers of quotes — there aren't any apostrophes.

You can print quotes in a string using the double quote "" like:

```
PRINT "Tom said 'Hello'."
```

This will print:

```
Tom said 'Hello'.
```

on the screen. Note that Basic interprets the double quote with nothing in between as meaning a single quote within the text.

This is what line 2580 is doing and PROCmsg starts:

```
PROCmsg(CHR$(34)+STR$,...
```

This is a double quote inside two single quotes and will print as a single quote on the screen. The procedure also ends with the same single-double-single quote.

Not only is it confusing on

paper it is also confusing on screen as well. An alternative would have been to use:

```
PROCmsg(CHR$(34)+STR$,...
```

where CHR\$(34) is the quote character. We'll try to watch out for this in future and use the alternative form wherever possible.

It's all a plot

IN the March 1986 issue of The Micro User, the Body Building article made use of an assembly language routine that plotted lines directly to the screen.

However, I found the explanation a little sparse, and the March 1984 issue, where I understand the technique is fully explained, is unavailable.

Would it be possible for you to explain this undoubtedly useful technique in an article, maybe with some of the other common assembly language problems such as printing numbers and floating point variables? — J. Rabone, Wirral, Merseyside.

● You'll find a full explanation of floating point variables and machine code maths in the September 1987 issue of Electron User.

Printing hexadecimal numbers is quite easy:

```
10 REM Hex print routine
20 FOR i=0 TO 2 STEP 2
30 PI=8000
40 [ OPT i
50 ,hexprint
60 PHA
70 LSR A
80 LSR A
90 LSR A
100 LSR A
110 JSR digit
120 PLA
130 ,digit
140 AND #80F
150 SDB
160 CLC
170 ADC #80B
180 ABC #840
190 CLD
200 JMP #FFEE
210 J
220 NEXT
230 INPUT "Number(0-255):"A:
240 CALL #80B
250 RUN
```

Printing decimal numbers

is slightly more difficult:

```
10 REM Decimal print
20 number=678
30 digits=872
40 zero=873
50 FOR i=0 TO 2 STEP 2
60 PT=8980
70 C OPT i
80 LBY #0
90 STY zero
100 LDA #4
110 STA digits
120 .loop
130 JSR sub
140 INY:JNY
150 DEC digits
160 BNE loop
170 .sub
180 LDX #ASC0-1
190 .loop
200 INX
210 SEC
220 LDA number
230 SBC table,Y
240 STA number
250 LDA number+1
260 SBC table+1,Y
270 STA number+1
280 BPL loop
290 CLC
300 LDA number
310 AOC table,Y
320 STA number
330 LDA number+1
340 AOC table+1,Y
350 STA number+1
360 CPX #ASC0
370 BNE here
380 LDA zero
390 BNE here
400 RTS
410 .here
420 TXA
430 INC zero
440 JMP $FFEE
450
460 .table
470 EQUW 10000
480 EQUW 1000
490 EQUW 100
500 EQUW 10
510 EQUW 1
520 J
530 NEXT
540 INPUT "Number";NX
550 !number=NX
560 CALL 8980
570 PRINT
```

Drawing lines and plotting points is more complex still and we haven't the space here to list a suitable routine. We have some articles planned on this topic for early next year.

Adventure writer

I HAVE had an Acorn Electron for three years and have noticed that the range and quality of software

in the August 1987 issue of Electron User G.Crawford asked for ideas about differentiation on the Electron.

Acornsoft used to publish a package of four programs called Algebraic Manipulation. These included programs to differentiate and integrate algebraic expressions typed in.

I don't know if this is the type of thing Mr Crawford is looking for, but even if it isn't, the programs were written in Basic and it should be relatively easy to

adapt procedures from them and incorporate them into his own programs.

As well as playing games, a lot of my time spent on the computer is devoted to programming, which I find extremely enjoyable.

I have, however, come across one very annoying aspect of writing adventure games – the long detailed text and complex graphical locations take up so much of the Electron's memory it is easy to run out.

I was pleased to see in the July 1987 issue of Electron User, that Mark Smiddy revealed a clever method which was able to cram up to 200 different Mode 2 screens on one disc.

I was very impressed indeed by this method, because I had always wondered how an adventure game I have, called Twin Kingdom Valley, had managed to include so many Mode 2 screens.

While programming, occasionally type:

PRINT TOP-PAE

and a number will be printed indicating how many bytes of memory the program occupies.

I have found that approximately 8400 is about the time to stop and finish the adventure otherwise when you run it you'll get a Bad mode error message.

One way to cut down on the memory used is to leave out unnecessary spaces

between commands, or simply use short descriptions where possible. Can you suggest any other helpful methods? – S. J. Champion, Brentwood, Essex.

● Twin Kingdom Valley draws its pictures in Mode 5 and switches to Mode 6 for the text. This gains an extra 10k of memory over a Mode 2 program.

The extra colours used for painting shapes are generated by using a clever technique called dithering. If you plot adjacent pixels in different colours they merge and produce a new one.

listing. Then RUN will execute the program normally.

I have been unable to find any reference to this in the literature I have, and would be interested to hear an explanation. – J.D.Bower, Thorburnald, Hull.

● You should treat the disc system just like a tape recorder. So to load a Basic program simply LOAD it – don't use *LOAD.

Alternatively, you can CHAIN it which loads then runs it automatically. You should not *LOAD a Basic program without either listing it or typing OLD as Basic gets very confused and reports an error.

Machine code and pure data files should be *LOADed. To find out whether a file is Basic or machine code use:

*INFO *,*

to print out the load, length and execution addresses. The name of each file is printed followed by four hexadecimal numbers.

The first is the load address – which should end E00 with a Plus 4. The second is the execution address – ending 8023 for Basic programs. The third is the length of the file and the fourth is the disc address.

An execution address ending 8023 indicates the file is Basic and you can either LOAD or CHAIN it.

Spelling checker required

there? If so, is the Compact version compatible with the Electron? – Neil Hoggarth, St. Cross, Winchester.

● Thank you for the help with our algebra. We weren't aware Acorn produced such a package for the Electron.

We haven't tried the Master Compact version of Viewspell on the Electron, but doubt whether it will work. The disc is quite likely to be double sided for starters.

Loads of problems

I HAVE found Micro Messages a very interesting and helpful part of Electron User. Can you explain something that is puzzling me?

I have not had much experience of disc usage, but recently bought a Watford Electronics drive and an ACP Plus 4.

If I load a program from disc with *LOAD and then run it I get the message "Syntax error at line 10" followed by "Bad program".

Line 10 is a REM statement and is the first line.

If I *LOAD the program then list it on the screen however, I get the correct

listing. Then RUN will execute the program normally.

I have been unable to find any reference to this in the literature I have, and would be interested to hear an explanation. – J.D.Bower, Thorburnald, Hull.

● You should treat the disc system just like a tape recorder. So to load a Basic program simply LOAD it – don't use *LOAD.

Alternatively, you can CHAIN it which loads then runs it automatically. You should not *LOAD a Basic program without either listing it or typing OLD as Basic gets very confused and reports an error.

Machine code and pure data files should be *LOADed. To find out whether a file is Basic or machine code use:

*INFO *,*

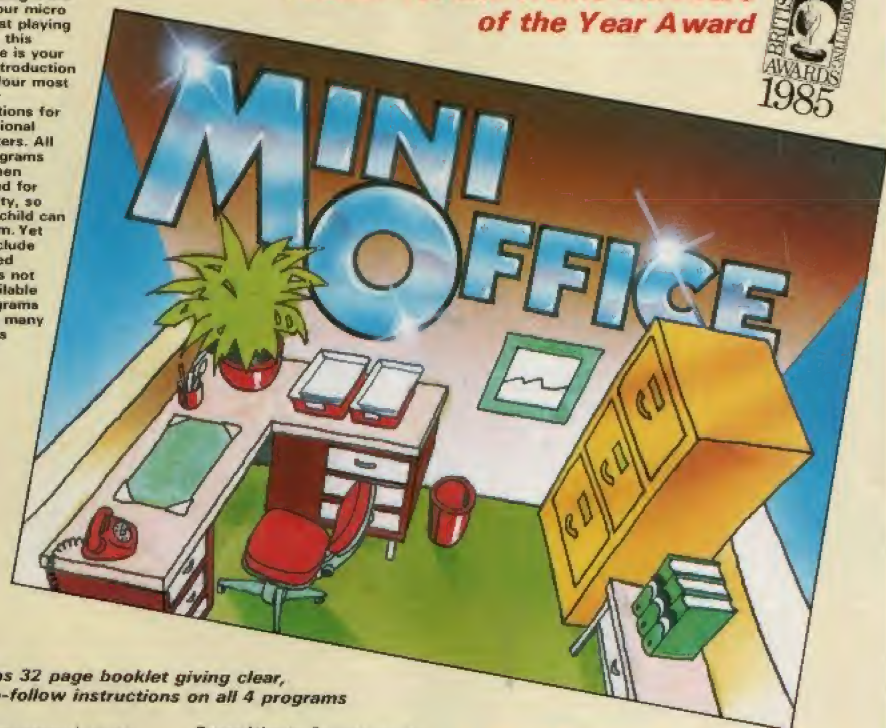
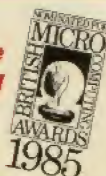
to print out the load, length and execution addresses. The name of each file is printed followed by four hexadecimal numbers.

The first is the load address – which should end E00 with a Plus 4. The second is the execution address – ending 8023 for Basic programs. The third is the length of the file and the fourth is the disc address.

An execution address ending 8023 indicates the file is Basic and you can either LOAD or CHAIN it.

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

**Finalist for the Home Software
of the Year Award**



**Contains 32 page booklet giving clear,
easy-to-follow instructions on all 4 programs**

Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode — perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program...

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

☆ **Word Processor** ☆ **Spreadsheet**
☆ **Database** ☆ **Graphics**

**Now they're
all together -
in ONE simple
package**

Four full-scale
programs for
an incredible
low, low price! **£5.95**
cassette

TO ORDER TURN TO THE FORM ON PAGE 53

Battle your way across the barren wastelands



In this superb arcade-style game you play the part of Commander Stryker, tramping across the radiation-wrecked landscape, shooting down the helicopters and jets which soar overhead. Blast the flesh off the Volgan soldiers as they come into view – and watch their skeletons crumple to the ground.

There's miles of awesome background scenery – bomb-struck buildings, military bases and gravestones to create a spine-tingling atmosphere.

Get Stryker's Run – it's a stunner!



SAVE UP TO £5

ACORN SOFTWARE

Acorn Electron Cassette £9.95

Play football's first interactive computer and board game!

Brian Clough's Football Fortunes is an exciting football management game with a difference – it combines an excellent range of computer-based features with a fascinating board game.

The result for the players is a package which is as much fun and as skilful to play as other best-selling board games, combined with the flexibility and speed of play which only a computer can supply.

Up for the Cup!

FEATURES

- Two to five players
- Four skill levels
- Variable game length
- Computer die
- Teleprinter
- Constantly updated league tables
- Assessments of each manager's performance

CONTENTS INCLUDE

- Electron software
- Playing board
- Five coloured counters
- 112 Player cards
- 10 spare Player cards
- Six Immunity cards
- Pack of money

SAVE UP TO £7



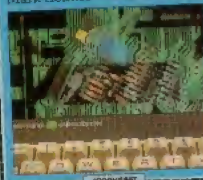
Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Electron	Stryker's Run	Tape	£9.95	£7.95	£2	£16.95	£5
Electron	Football Fortunes	Tape	£14.95	£11.95	£3	£19.95	£7

TO ORDER PLEASE USE FORM ON PAGE 53

This is THE ultimate guide to the Electron!

acorn electron ADVANCED USER GUIDE

Mark Holmes & Adrian Dickens



Quite simply, the *Electron Advanced User Guide* is THE essential handbook that will allow you to exploit the full potential of the Electron.

Don't miss this money-saving offer!

Only £3.45 (inc. P&P)

SAVE a massive £6!

(Normal price £9.45)

UK readers only

This detailed guide to the Electron's operating system is a must for every serious Electron user. In its information packed pages you'll find:

- ★ Full details of how to implement the powerful *FX/OSBYTE calls.
- ★ Page ROMs revealed: The way they work and how to write your own.
- ★ Programming the ULA - all you need to know.
- ★ Full coverage of memory allocation and usage - make every byte count.
- ★ Complete circuit diagram: How to use the expansion capabilities Electron's exciting to the full.

and much, much more . . .

**Save
£3
on this
classic book!**

Exclusive offers ONLY for readers of Electron User

This best-selling book takes the reader through the fundamentals of writing programs. Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality - good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating his own programs.



UK readers only

Was £5.95 NOW £2.95



**ONLY
£3.95**

Your Electron needs protecting!

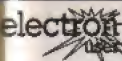
Protect your Electron with our luxury dust cover made of soft pliable water resistant vinyl, bound with strong cotton and decorated with the Electron User logo.

Keep your copies neat and clean!

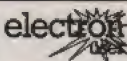
This handsome binder is bound in attractive red pvc with the Electron User logo in gold blocking on the spine. It will hold 12 magazines firmly secured in place by metal rods.



**ONLY
£3.95**



MAIL ORDER OFFERS



ORDER FORM

All prices include postage, packing and VAT
Overseas orders sent exclusively by Air Mail

£ p

Electron User subscription

UK £12 3001
Europe & Eire £20 3003
Overseas £35 3004

Commence with _____ Issue

Renewal

UK £12 3002
Europe & Eire £20 3476
Overseas £35 3477

Strykers Run

NEW

With sub* Without sub
Cassette only £4.95 £7.95 3130/3131

* This offer only available if accompanied by a subscription order or renewal

Brian Clough's Football Fortunes

NEW

With sub* Without sub
Cassette only £7.95 £11.95 3132/3133

* This offer only available if accompanied by a subscription order or renewal

Electron User back issues

£1.50 UK	Jan 1987	3210	
£2.50 Europe	Feb 1987	3211	
£3.50 Overseas	Mar 1987	3212	
	Apr 1987	3213	
	May 1987	3214	
	June 1987	3215	
	July 1987	3216	
	August 1987	3217	
	September 1987	3218	

Back Issue bundle

NEW

April 86-Dec 86 (9 complete issues) 3017

UK £3.90, Europe Inc Eire £8.90, Overseas £16.90

Cassette tape annual subscription

UK £35 3005
Europe/Overseas £45

Commence with _____ Issue

Renewal

UK £35 3006
Europe/Overseas £45

Electron User tapes/discs

Tape £3.95, Discs £4.75. Overseas/Europe add £1

	Date	Title	Price
Fishing	June 1986	3303	
Royal Wedding	July 1986	3304	
Howzat	Aug 1986	3305	
Cavern Capers	Sept 1986	3306	
Rat Catcher	Oct 1986	3307	3407
Day at the Races	Nov 1986	3308	3408
Santa's Sleigh	Dec 1986	3309	3409
Grid Warrior	Jan 1987	3310	3410
Maze	Feb 1987	3311	3411
Super Boes	Mar 1987	3312	3412
Dragons Doom	Apr 1987	3313	3413
Hectic Henry	May 1987	3314	3414
Hungry Harry	June 1987	3315	3415
Mazebugs	July 1987	3316	3416
Arenia	Aug 1987	3317	3417
Mr Miner	Sept 1987	3318	3418
Witchcraft	October 1987	3319	3419

Readers in Europe (inc Eire) add £2. Overseas add £5 per item unless otherwise indicated

Send to: Electron User, FREEPOST, Europa House, 58 Chester Road, Hazel Grove, Stockport SK7 5NY.
(No stamp needed if posted in UK) Please allow 28 days for delivery.

Order at any time of the day or night

Telephone Orders: 061-429 7931
Orders by Post: Key 'B', then 614568363
MicroLink/Telecom Gold 73-MAG001

Don't forget to give your name, address and credit card number

ENQUIRIES ONLY: 061-480 0171 9am-5pm

Valid to October 31, 1987

Please enter number required in box £ p

Knitwear Designer

Tape £8.95 3128
5.25" Disc £9.95 3129

Add £2 for Europe; £5 for Overseas

Nursery Rhymes

NEW

Tape £5.95 3108
3.5" Disc £5.95 3109

Add £1 for Europe/Overseas 3018/3019

Education Special Vol. 2

Classroom Computing on the Electron

Magazine + Electron Cassette £3.95 3007
Magazine + Electron 3.5" Disc £4.95 3008

Add £2 for Europe/£4 for Overseas

Fun School

Tape £4.95 3080/3108
Ages 5-8 3081/3109
Ages 8-12 3082/3110

Add £1 for Europe/Overseas

Getting Started in BBC Basic

UK only £2.95 3100

Acornsoft Database

Needs a Plus 3 Disc £9.95 3119

Add £2 for Europe; £5 for Overseas

Advanced User Guide

UK only £3.45 3072

Mini Office

Tape £5.95 3062
Europe/Overseas £8.95

Magic Sword

Tape £5.95 3065/3105
3.5" Disc £5.95

Add £2 for Europe; £5 for Overseas

Ten of the Best

Tape £5.95 3120/3121
Volume 1 3068/3111
Volume 2 3069/3112
Volume 3 3070/3113
Volume 4 3120/3121

Add £1 for Europe/Overseas

French on the Run

Tape £9.95 3115

Micro Olympics

Add £1 for Europe/Overseas Tape £5.95 3014

Classic Card and Board Games

No. 1 } Tape £5.95 3090
3.5" Disc £7.95 3092
No. 2 } Tape £5.95 3091
3.5" Disc £7.95 3093

Add £1 for Europe/Overseas

Electron Dust cover

UK £3.95 3058
Europe/Overseas £4.95

Magazine Binder

UK £3.95 3059
Europe £6.95
Overseas £10.95

TOTAL

Payment: please indicate method (✓)

☐ Access/Mastercard/Eurocard/Barclaycard/Visa

Expiry Date _____

☐ No.

☐ Cheque/Eurocheque made payable to Database Publications Ltd.

Name _____ Signed _____

Address _____

Post Code _____

Tel _____

EU10

SOFTWARE AT BARGAIN PRICES

SPECIAL PURCHASE

Plus I Interface
with View Wordprocessor

£53.95

Plus I only

£44.95

QUICK SHOT I

Joystick use
with Plus I

£6.95

MICROPOWER TITLES AT £1.99 EACH

Adventure
Bumble Bee
Chess
Croaker
Cybertron Mission
Danger UXB
Electron Invaders
Escape from Moonbase Alpha
Feelix and Fruit Monsters
Frenzy
Galactic Commander
Moon Raider
Positron
The Mine
Swap
The Gauntlet
Ghouls
Felix Evil Weevils
Rubble Trouble
Bandits at 3 O'clock
Stock Cars
Killer Gorilla
Jet Power Jack
Swag
Felix in the Factory

ACORNSOFT TITLES

Sphinx Adventure £1.00
Starship Command £1.00
Hopper £1.00
Chess £1.00
Arcadians £1.00
Talkback £1.50
Workshop £1.50
Desk Diary £1.00
Business Games £1.00
Boxer £1.00
Me and My Micro £1.00
Snapper £1.00
Complete Cocktail Maker £1.00
Watch Your Weight £1.00
Creative Graphics £2.50
Personal Money Management £2.50

OTHER TITLES

Turtle Graphics £2.25

Advanced User Guide £3.25

IVAN BERG SERIES

I Do £1.50
Theatre Quiz £1.50
English CSE/GCE £2.00
Biology CSE/GCE £2.00
Maths 1 CSE/GCE £2.00
Maths 2 CSE/GCE £2.00
ROM CARTRIDGES
View (Wordprocessing) £11.95
Viewsheets £11.95
Logo £28.50
Lisp £7.75

MIRRORSOFT EDUCATIONAL

AT £2.99 EACH

Count with Oliver
Joffe Plans (Weight Watching)
Know your PSI/Q
Know your Personality
Look Sharp
A.S.K. AT £2.99 EACH
Cranky
Words, Words, Words
Number Chaser

NEW BUDGET RANGE FROM SUPE-

RIOR AT £2.49

Fruit Machine
Invaders
Draughts
Reversi
Stranded
Mr Wiz
Chess
Smash and Grand
Percy Penguin
World Geography
Allen Dropout
Centibug
Zany Kong Jr
Overdrive
Tempest
LANGUAGES
Linkword Italian £2.25
Linkword German £2.25
Linkword Spanish £2.25

BUDGET TITLES

Daredevil Dennis £1.99
Snooker (Visions) £1.99
Millionaire £1.99
Bird Strike £1.99
Licence to Kill £1.99
Tarzan (Martech) £2.99
Dunlunz £2.99
Football Manager £2.99
Flight Path 737 £2.99
Hercules £1.99
Hunkie Dorey £2.99
Ice Hockey £2.99
Kane £1.99
Micro Value (4 games) £3.99
Plan B £2.99
Robato £2.99
Sky Hawk £2.99
Star Force 7 £2.99
Tennis £2.99
Vegas Jackpot £1.99

CURRENT TITLES

Strykers Run £7.50
Codename Droid £7.50
Craze Rider £7.50
Big K.O. £6.50
Brian Clough Football £12.50
Collosus 4 Chess £7.50
Future Shock £6.50
Goal £6.50
Psychastria £6.50
Sphere of Destiny £6.50
Palace of Magic £7.50
Superior Hits Vol 3 £7.50
Elite £10.50
Five Star Games 2 £7.50
Ravenskull £7.50
10 Computer Hits 1 £7.50
10 Computer Hits 2 £7.50
10 Computer Hits 3 £7.50
Computer Hits 5 £5.95
Around World Repton £5.50
Repton 3 £7.50
Paper Boy £7.50

TOWERHILL COMPUTERS LTD

Unit 2 Wharfside

Fenny Stratford, Milton Keynes, MK22AZ.

Telephone: Milton Keynes (0908) 74246

ALL PRICES INCLUDE V.A.T. AND P&P. OVERSEAS ORDERS ADD £1.00



This is no rat race...

STEPHEN and ANDREW WEIR present
an exciting quiz game for youngsters

SNAIL trail is a superb educational quiz for children, the object being to help Suzie the snail win a race against her five animal friends - Willie the worm, Belinda the bird, Percy the penguin, Charlie the cat and Desmond the dog.

The farmyard is in uproar as Willie, who is to be the first competitor, slithers up to the starting line.

Farmer Giles raises his gavel and taps three times on the rickety old gate. A hush descends over the expectant crowd as the old man explains the rules.

Five challengers take on Suzie in a test of her knowledge of animals. Each question is multiple choice and the fastest competitor will win the race. Let the contest begin.

Sadly, Suzie isn't very fast so you will have to help. When each question appears, tap the spacebar until the pointer is opposite the answer that you think is right. Press Return to confirm your selection.

If you answer correctly, you will receive a tick and

Suzie will move forward. An incorrect answer however, will result in a cross and Suzie's opponent racing ahead.

Don't spend too long on your answer either, because time, and animals, wait for no snail.

Included in the program is the facility to add your own questions. These should be constructed in the following format:

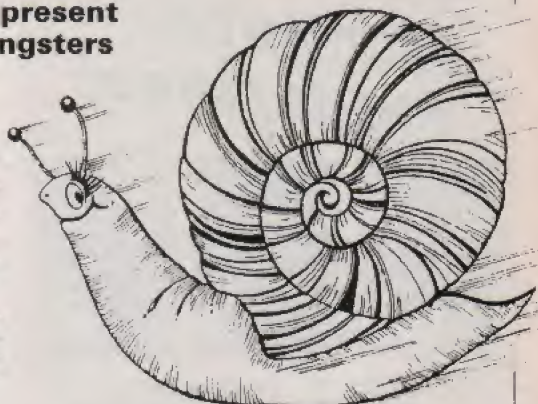
1401 DATA Question, Correct answer, Up to four incorrect answers, "A"

For instance:

1401 DATA Which of these is an omnivore?, A human being, A dog, A cat, A hedgehog, A lion, "A"

There is space for 10 lines of data between 1400 and 1409, although the program can be renumbered to recover more space if you wish.

The last line of data must be the word **END**, as this flags the end of the questions and answers.



PROCEDURES

main The main loop.
assemble Assemble machine code.
big() Print large text.
sprite Print the sprites.
arrow Print the pointer.
bench Set up the screen.

CONTROLS

spacebar Moves pointer
Return Confirms answer
Q Turns the music off
S Turns music on

VARIABLES

creatures Number of animals
level% Current level of play
choice Number of answer given
answered True when a question answered
won True if the snail wins
name\$(i) The animals' names

Snail Trail

What is a cat?

An amphibian
A bird
A fish
A mammal
An insect

Level 3

**F
I
N
I
S
H**



```
10 REM Snail Trail
20 REM By Stephen Weir
30 REM and Andrew Weir
40 REM (c) Electron User
50 IF PAGE=4000 GOTO 1420
60 GOSUB 80
70 PROCmain
80 MODE6
90 in:=creatures*5
100 MODE5
110 code=B900:PROCassemble
120 #t=1,0
130 DIMcol$(creatures,2),c
140 choice$(6),name$(creatures):R
150 STORE150:FORI=1TOcreatures
160 READname$(I),col$(I,1),co
170 I(I,2):NEXT
180 RETURN
190 DATA0,1,3,Bird,2,3,
Cat,4,6,Penguin,6,3,Dog,1,3
160 REM Tune data
170 DATA52,3,48,1,52,4,72,
4,52,4,-1,52,4,4,68,8
180 DATA40,3,36,1,40,4,68,
4,40,4,-1,40,4,32,4,32,8,24,
4,40,4,32,4,44,4,48,4,68,4,5
2,4,-1,52,4,72,2,68,2,68,4,5
2,4,72,4,68,4,68,4,72,4,-9
190 DEF PROCsprite.data
200 DIM level:snail 146
210 arrow 66,animals 146*creat
220 res
230 RESTORE300:PROClocate(
level)
240 RESTORE320:PROClocate(
snail)
250 RESTORE360:PROClocate(
arrow)
```

Turn to Page 57 ▶

Snail Trail listing

From Page 55

```

240 RESTORE39H:FORsprites=
170:creatures:PROClocate(anim
als:150+sprites:11):NEXT
250 ENDPROC
60 DEF PROClocate(loc) LD
CALbyte,data,count,offset,x,
y:READx,y?loc=x?(loc+1)?y:
loc:loc*2:byte=B:REPEAT READ
data:ldata:=Bbyte?loc:data
270 IFdata=1:READcount,data
a:FORoffset=1:TOcount:byte?l
oc:data:byte=byte+1:NEXT ELSE
byte=byte+1
280 UNTILdata=-9:ENDPROC
290 REM level
300 DATA 6,8
310 DATA -1,0,0,-1,6,34,51
0,0,0,0,17,34,51,34,153,0,0,
34,170,170,17,153,0,0,0,153
170,187,34,17,0,34,34,34,17
0,170,34,187,0,-9
320 REM Snail
330 DATA 6,24
340 DATA 0,0,16,3,18,37,67
5,37,67,5,37,3,153,1,16,0,
0,16,112,120,90,165,15,
15,14,12,41,3,66,7,7,22,66,0
9,15,15,131,14,131,240,240
240,180,74,45,13,30,7,3,129
44,6,10,26,11,36,6,73,11,15,
15,13,52,240
350 DATA 240,240,90,0,0,12
0,4,74,40,72,30,13,30,5,37,2
8,45,15,26,68,32,240,240,240
210,185,0,-1,11,0,16,48,112
-1,5,240,210,128,133,-1,7,0
18,10,6,12,24,26,194,224,40
84,84,144,225,104,192,-1,4,
0,-9
360 REM Arrow
370 DATA 6,8
380 DATA -1,0,0,51,48,-1,7
0,16,16,16,-1,4,0,255,240,-
1,4,0,16,16,0,128,192,224,24
0,242,115,11,251,243,115,17
4,240,224,192,128,-1,5,0,128
192,232,252,232,192,128,-1,
4,0,-9
390 REM Worm
400 DATA 6,24
410 DATA -1,15,0,16,48,48
112,112,240,210,185,165,-1,7
0,16,16,48,112,112,240,240
40,225,240,210,225,180,194,4
0,20,1,6,0,112,-1,6,240,21
0,240,180,193,0,128,-1,12,0,
128,128,192,192,224,240,240,
240,180
620 DATA 120,165,240,37,82
48,1,-1,14,0,128,192,194,22
5,180,210,180,210,128,120,12
0,0,48,-1,15,0,128,224,240,48
116,176,240,224,192,-9
430 REM Bird
440 DATA 6,24
450 DATA -1,15,0,48,112,24
0,112,-1,15,0,16,48,97,195,1
35,195,225,240,180,180,64,64
96,112,0,0,0,16,16,32,11
2,112,195,158,45,75,135,15,3
0,120,240,112,168,64,64,96,1
12,112,240,240,195,194,225,2
48,248,225
460 DATA 225,184,120,120,1
20,-1,4,240,224,1,5,0,128,2
24,224,195,74,225,168,60,120
112,5,240,224,224,192,1

```

```

92,128,-1,10,0,8,-1,6,128,-1
13,0,-9
470 REM Cat
480 DATA 6,24
490 DATA 204,-1,5,98,51,-1
4,49,115,115,115,115,243,24
3,247,119,247,243,243,115,49
-1,10,0,192,240,-1,4,252,24
8,248,112,16,0,136,136,204,-
1,11,0,192,-1,5,240,252,243
248,16,0,0,112,33,33,16,16
16,-1,4
500 DATA 48,16,48,49,241,2
41,243,243,247,238,238,230,2
47,243,115,112,240,123,107,2
41,240,244,229,244,245,162,1
36,136,-1,10,0,136,128,192,1
92,72,64,128,72,128,136,-1,1
5,0,-9
510 REM Penguin
520 DATA 6,24
530 DATA -1,67,0,1,1,3,0,7
0,1,1,-1,5,3,1,1,3,3,7,7,7
31,47,47,111,255,127,124,112
48,12,14,47,127,93,93,127,6
2,30,31,-1,4,63,47,110,11
0,238,248,192,224,96,176,-1,
4,0,8,128,192,128,-1,4,0,-1,
5,0,-1,7
540 DATA 0,-9
550 REM Dog
560 DATA 6,24
570 DATA 82,164,74,132,72
164,64,37,98,165,90,165,90,1
65,98,164,67,133,75,140,73,1
65,73,16,-1,7,0,248,240,1
60,180,90,165,98,165,240,1
20,0,128,72,128,72,-1,7,0,22
5,240,225,210,165,90,165,90,
165,98,37
580 DATA 82,37,64,52,66,48
37,82,33,48,48,48,33,222,16
9,186,221,213,110,185,74,134
14,44,6,36,96,22,164,18,161
82,224,230,170,186,165,90,1
65,98,165,74,188,18,-1,10,0,
128,0,0,51,123,150,120,180
104,224
590 DATA 192,64,128,-1,10,
0,-9
600 DEF PROCassemble
610 bswrch=FFEE:osword=4F
FF:new=0:rows=672:columns
=673:temp=674:places=676
620 FORpass=0:TO2:STEP2:Px=c
ode:LOTPass
630 LD STAB:LDJ#0:LDX#A
NB255:LDY#A:LDY#5:JSRswrch
LDX#0:STAJ:LDJ#255:JSRsw
wrch:LDJ#255:LDJ#5:JSRswrch
LDJ#5:ASLA:ASLA:TAX:LDY#4:ds
JNX:LDJ#X:JSRswrch:LDJ#4:ds
JNX:LDJ#X:JSRswrch:DEX:0PLD3:R
T5
650 .sprite LDJ#0:LDJ#A:place
:STANewdata+1:LDJ#A:STJ#A
Newdata+2
660 .loop1:LDJ#A:STJ#A:State
p+1:loop2:Newdata LDJ#0:00H,Y
:00H,X:Y:STANew:Y:INCNe
wdata+1:ENB3:Newdata+2:
d3 LDJ#A:NEW:47:CMPT7:BEQ0:
tton2
670 INCNew:BNEP4:INCNew+1:
p4 BNE next2
680 .bottom2 CLC:LDJ#A:AD

```

```

CWB3:STANew:LDJ#A:STJ#A:
STANew+1,next2:DEX:BNE loop
2:LDJ#A:temp:LDJ#0:STANew:LDJ
temp+1:ADJ#0:STANew+1:DECcol
umns:BNE:loop1:RTS
690 .do:1:=0:=9:=j+1:=5:=CH
RS11:CHRS225:CHRS0:CHRS10:CH
RS224:NEXT:ENDPROC
700 ENDPROC
710 DEF PROCbig(AS) FORCHZ
=1:TOLENAS:AI=ASCMIOS(AS,CHZ
1):CALLD:NEXT:ENDPROC
720 DEF PROClarge(AS) FORC
HX=1:TOLENAS:BX=MIOS(AS,CHZ):
1870:ASC BX:AX=10:XX=870:YX=
0:CALL AFFFF:VDU23,250,2671,
2671,2671,2671,2672,2672,267
2,2672,23,251,2673,2673,2673
2,2673,2674,2674,2674,2674
730 VDU23,252,2675,2675,2675,26
75,2675,2676,2676,2676,2676,
23,253,2677,2677,2677,2677,7
678,2678,2678,2678:FORIX=1:TO
4:VDU24+IX:1:IFIX<4 VDU8,10
740 NEXT:VDU11,11,11:NEXT:
ENDPROC
750 DEF PROCmouse
760 REPEAT PROCinstruction
s
770 PROCbench
780 Level:=0:REPEATLevel:=
Level+1

```

This is one of hundreds of programs now available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs will also run on the Electron.

```

0:FORIX=1:TO35:PROCnote(1,5):
NEXT:PROCwait(8)
920 IFlost:PROCclear:COLOUR
35:PRINTTAB(6,4):PROClarge("
Bad Luck!!"):PRINTTAB(120-LE
NName$(Level(3)):DIV2,75):PRO
CbigName$(Level(3)):COLOUR2:
PRINTTAB(1,10):PROCbig(Y)
Have lost to A!):RESTORE170
:FORIX=1:TO35:PROCnote(3):NEK
T:PROCwait(7)
930 PROCsprite(snail,snail
X):PROCcreate(levelX,creat
ureX)
940 answered=1:UNTILlevel
X=creatureX OR lost OR KEY1
=27
950 UNTILO
960 DEF PROCbench VDU22,3,
5,23,820:0:0:0:GCOL0,1:PRO
Cbox(170,940,1010,1000,-1):G
COL0,2:PROCbox(140,960,990,1
830,-1):GCOL0,0:MOVE220,1010
:PROCbig("Snail Trail")
970 GCOL0,3:PROCbox(30,40,
1250,374,0):MOVE1120,374:ORA
1120,48:MOVE30,287:ORAM1120
287:AS="FINISH":GCOL0,2:FOR
IX=1:TO6:MOVE112,16-IX+50+9
0:PRINTMIOS(AS,11,1):NEXT
0:PROCsprite(level,85900
):VDU4
990 levelX:=answered=1
1000 DEF PROCcross MOVE1000
500:ORAM1190,650:MOVE1190,5
80:ORAM900,640:ENDPROC
1010 DEF PROCwait(1) FORIX=
1:TO1000:NEXT:ENDPROC
1020 DEF PROCsprite(screen
,screen) newscreen:places
tored+2:rows=(tored+1):7c
olumns=(tored:CALLD:EN
DPROC
1030 DEF PROCbox(x1,y1,x2,y2
,fill) MOVEX,y1:IF fill MOV
EX2,y1:PL0T85,x1,y2:PL0T85,x
2,y2 ELSE DRAWX1,y2:DRAWX2,y
2:DRAWX2,y1:ORAMX,y1
1040 ENDPROC
1050 DEF PROCsetup VDU19,1,
col2:levelX(1):0:19,2,col2(1
levelX,2):0:snail:=7900:cre
atureX=6730:PROCsprite(snail
,snailX):PROCcreate(level
X,creatureX):COLOUR2:PRINTTA
B(18,1):levelX:=lost:=own=0:
right=0:ENDPROC
1060 DEF PROCcreate(level
X,screen) PROCsprite(animals
+146+(levelX-1),screen):ENDP
ROC
1070 DEF PROCsnail PROCspri
te(snail,snailX):snail:=snail
128:PROCsprite(snail,snailX
):SOUND0,-5,7,2:IFsnailX=874
48 THEN own=1
1080 ENDPROC
1090 DEF PROCcomponent PROCc
reature(levelX,creatureX):cr
eature:=creatureX+8:PROCcrea
ture(levelX,creatureX):SOUN0
0,-5,5,2:IFcreatureX=4748
lost=1
1100 ENDPROC
1110 DEF PROCclear VDU28,0,
18,19,4,12,26:ENDPROC
1120 DEF PROCprint PROClea

```

Snail Trail listing

From Page 57

```

r:RESTORE1320:LOCALcount:FOR
count=1TORN0(50):PROCread:IF
end: RESTORE1320:count=count
t-1
1130 NEXT:correct%:=1:FORI%:=
1TORN0(20):AX=RND(CHOICES%):
BX=RND(CHOICES%):d%:=CHOICES(
A%):CHOICES(A%):CHOICES(B%):
CHOICES(B%):d%:=IFAX=correct%
correct%:=B%ELSEIFBX=correct%
% correct%:=A%
1140 NEXT
1150 a%:=21:REPEAT pos%:=INST
R(questions%,"a%"):IF pos%<
=21ANDpos%>0 chop%pos%ELSE
a%:=a%-1
1160 UNTILpos%<=21ANDpos%>0
q%:=LEFT(questions%,chop%-
1):q%:=RIGHT(questions%,LENq
uestions%-chop%+1)
1170 COLOUR2:PROCen(q%1,4)
:PROCen(q%2,8):COLOUR3:FORI
:=1T0CHOICES%:PRINTTAB(3,9)+
IX-1)+2):CHOICES(I%):NEXT:se
lect%:=1:PROCarrow(select%)
1180 answered%:=0:ENDPROC
1190 DEF PROCen(x%,y%) PRI
NTTAB((20-LENx)/2+1,y%):A%:
:ENDPROC
1200 DEF PROCarrow(x%) PROC
sprite(arrow,x%+2+8)*6148+4
5884):ENDPROC
1210 DEF PROCread READquest

```

```

ion%:=1:question%:=END:END%--
1:ENDPROC ELSE END%:=1%:=0:R
EPEAT IX-1)+1:READCHOICES(I%
):UNTILCHOICES(I%):*%:=1%:=1%
~1CHOICES%:=I%
1220 ENDPROC
1230 DEF PROCnote(tempo) RE
ADDT:1Fp%:=150001,B,0,1 ELSE
1Fp%:=9 RESTORE170:SOUND1,
B,0,4*tempo ELSE READDT:SOUN
D1,-B,p%+48,4*tempo
1240 ENDPROC
1250 DEF PROCinstructions V
DU22,4,23;820;0;0;0;0;
1260 PRINTTAB(14,1):PROCLA
RGE("SNAIL TRAIL")
1270 PRINTTAB(8,7):"Help Su
zle Snail race against her"
"farmyard friends by answer
ing questions""about anima
ls.""To answer a questio
n, move the arrow""until i
t sits beside the answer you
""think is best.""
1280 PRINT"to move the arro
w use the ";COLOUR129:COLOU
R2:PRINT"spacebar";COLOUR1:
COLOUR128:PRINT""When yo
u have done this, press ";C
OLOUR129:COLOUR2:PRINT"retur
n";COLOUR128:COLOUR1:PRINT
"
1290 IF NOTIN PROCsprite.da
ta:in%:=1
1300 *%:=21

```

```

1310 PRINTTAB(10,30):PROCb
ig("Press the ");COLOUR129:C
OLOUR2:PROCbig("spacebar");R
EPEATUNTILGET%:=32:ENDPROC
1320 DATA Who blew the hous
e in?,The Big Bad Wolf,Red R
iding Hood,Puff the Dragon,R
oland Mollilove,Wizard of Oz
,"",How does a dolphin see
at night?,sonar,electric eye
s,400w bulbs,It can't,""
1330 DATA How many legs doe
s an insect have?,Six,Two,Fo
ur,Eight,Thousands,"",Which
of these birds is flightles
s?,Penguin,Maggie,Pigeon,Ala
ckbird,""
1340 DATA How many legs doe
s an Octopus have?,Eight,Six
,Fen,Twelve,"",What is a ca
t?,A mammal,A fish,An amphib
ian,A bird,An insect,""
1350 DATA Where does a griz
zly bear sleep?,In a den,In
a house,On a nest,Up a tree
,"",What does a seagull have
for breakfast?,Fish,Cornfla
kes,fried eggs,Pork,Potatoes
,""
1360 DATA Where do alligato
rs hold their young?,In thei
r mouths,On their back,In a
pouch,"",Which animal can g
row a saddle?,A worm,A fish
,A bird,A horse,""

```

```

1370 DATA What does a drago
n fly breath?,Air,Fire,Water
,"",What country do Kiwis c
ome from?,New Zealand,Englan
d,Ireland,America,Spain,""
1380 DATA How do ants talk
to each other?,Using anten
nae,With their mouth,Sign la
nguage,A dance,"",How do be
es talk to each other?,A dan
ce,Using antennae,With their
mouth,Hearing aids,""
1390 DATA Which of these is
not a type of ant?,Navigati
on ant,Soldier ant,Nurse an
t,Worker ant,Queen ant,"",Wh
en will a dead frog kick its
leg?,Electrical shock,Gets
a fright,burial cremation,At
the funeral,""
1400 REM add extra question
s here
1410 DATA END
1420 *KEY 0 *T.IMDX=PAGE-6E
00:FOR IX=PAGE TO TOP STEP4:
!(IX-DX)=IX:NEXT:IMPAGE=6E00
IMOLDIMRUM:IM
1430 *FX 138,B,128

```

This listing is included in this month's cassette tape offer. See order form on Page 53.

electron

MAIL ORDER OFFERS

electron

MAIL ORDER OFFERS

SALE!

This could be your last chance to build up a library of fun and knowledge from our back issues!

The nine complete issues, April to December 1986:

Games: Invasion Force, Missile Jammer, Fishing, Snap, Cricket, Cavern Capers, Horse Racing and Santa's Sleigh. **Machine code:** Osword calls, *CODE and *LINE explained, text editor and Basic compiler. **Discs:** Recover lost files, random access filing and extra commands. **Education:** Music tutor, Crocodile Tears, Maths Fun, Company Count and Yule Spell. **Graphics:** Screen dumps, Draw Writer and all Basic commands explained.

Only £6.90

Need a binder for your magazines? We'll send one for £3.95

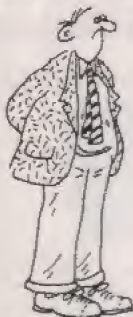
* Price includes p&p (UK only)

TO ORDER TURN TO THE FORM ON PAGE 53

COMPUTERSPEAK EXPLAINED

MANY newcomers to microcomputing are puzzled by the multitude of technical terms and jargon used by the so called computer experts and sales representatives.

It is strange how straightforward words and phrases take on a completely different meaning when used in a computing context. So we have compiled this easy-to-read guide to computer jargon for the novice:



NOVICE ELECTRON OWNER

- *"Guaranteed delivery within 21 days"* – A universal constant, as whenever you ask the question, delivery will always be within 21 days.
- *"Delivery will be at the end of the month"* – Another way of stating the universal constant, for the innumerate.
- *"In stock"* – We have ordered it from the manufacturers.
- *"Now in stock"* – When the closing date for the advertisement was reached three weeks ago, we were promised delivery inside a fortnight.
- *"Tomorrow's technology, today"* – It arrived here a day early.
- *"Obsolete"* – We've had it in stock for more than a week.
- *"Will be available shortly"* – We haven't actually made one yet, but can foresee no problems.
- *"Will be available later in the year"* – We discovered a few problems.
- *"Will be available sometime next year"* – We lost the blueprints.
- *"Compatible with all Electron add-ons"* – Will not work with your computer unless you know more about interfacing than we do.
- *"Standard"* – We don't know enough about other interfaces to know why it won't work with yours.
- *"Universal standard"* – We have tried it out on a BBC Micro.
- *"Industry standard"* – We copied the design from someone else, and they say it works.



- *"Easily expandable"* – There are a lot of sockets on it, but we don't know what to do with them.



- *"Uses your own TV as a display"* – Sometimes you may actually be able to read what is on the display as well.

- *"Operating system"* – Something we sell you every six months or whenever you find the bugs in the last one we sold you.

- *"The applications are only limited by your own imagination"* – We can't think of anything useful it can do.

- *"The program can easily be modified to run on other versions of the Electron or BBC Micro"* – Sometimes seen at the end of articles and is a disclaimer the author might have falsely indicated to the reader.

- *"Programs can be saved on to any domestic tape recorder"* – This is any recorder except the one you actually own at the moment.

- *"User friendly"* – You are asked for every little option and parameter to see if it

needs to be included. This will take at least 10 minutes and you will have to go through the whole lot again if you want to change something.

- *"A must for every Electron user"* – It's nothing new and we couldn't think of anything original to say about it.

- *"Buy now at specially discounted prices"* – The product is about to be discontinued.



- *"Powerful"* – It's so good, even we can't understand it.

- *"Advanced"* – So complex, even the programmer can't understand it.



- *"Easy to use"* – The average postgraduate of computer science should experience no difficulty.

Turn to Page 60 ►

Feature

4 From Page 59



● **"Comprehensive documentation"** – Roughly photocopied bundle of misspelt typescript masquerading as a manual.

● **"Extensive documentation"** – Large, poetically written tome of no technical use whatsoever.

● **"Bug"** – A feature not included in the documentation.

● **"Feature"** – A documented bug.

● **"Ram"** – Unintelligent, male herbivorous quadrupedal mammal.

● **"Massive ram"** – Mean looking beast, approach with extreme care.



● **"Rom"** – An illiterate ram.

● **"WYSIWYG"** – What you see is what you get. We don't supply the plug, the cassette lead, the instructions...

● **"WIMP"** – Any computer literate person of non-Electron persuasion.



● **"Mouse"** – Small, incredibly cute, but odiferous rodent.

● **"Disclaimer"** – We do not accept there are any bugs in this software preventing it from doing its job.

● **"Software"** – A jumper produced from the output of Database Software's Knitwear Designer program.

● **"Hardware"** – Software made from steel wool.

● **"Firmware"** – Another name for hardware.

● **"Shadow ram"** – memory chips that work in the dark.

● **"Second processor"** – The first one we sold you doesn't actually enable you to do anything useful, for that you'll need a new one.

● **"Fred, Jim and Sheila"** – The three people who designed the Electron.



● **"Plus 1"** – Contains all the bits they forgot to include in the Electron.

● **"Plus 3"** – Contains all the bits they forgot to include in the Plus 1.

● **"Turbo driver"** – An Electron user with go-faster stripes on his micro.

C & F ASSOCIATES

BARGAIN PRICE ELECTRON SOFTWARE

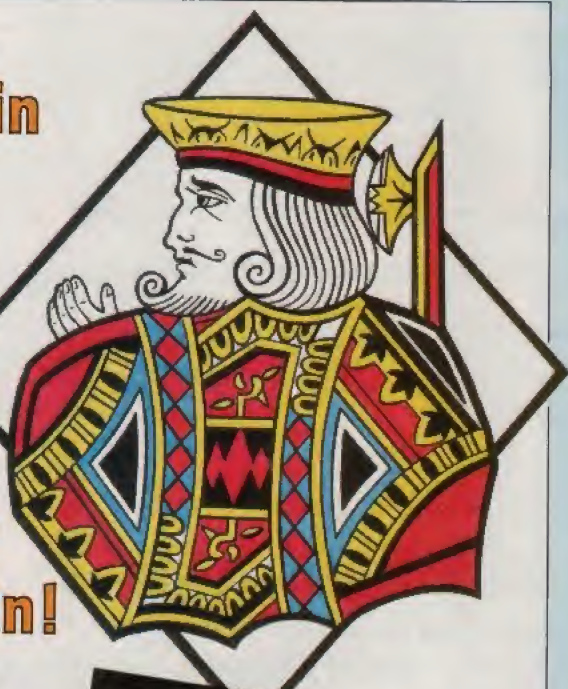
ADDICTIVE	PRICE	CDS	PRICE	MACSEN	PRICE	SUPERIOR (continued)	PRICE
Football Manager	2.99	Colossus Chess 4	7.75	Blockbusters	6.50	Superior Collection 3	7.75
		Steve Davis Snooker	6.95			Superior Collection 3 (disc)	12.95
ALLIGATA		Brian Clough Football Fortune	12.95	MARTECH		Acornsoft Title 1	7.75
Action Pack	1.99			Tarzan	7.75	Acornsoft Title 2	7.75
Action Pack 2	4.50	DATABASE				Repton 3	7.75
ALTERNATIVE		French on the Run	7.75	MELBOURNE		Ravenhill	7.75
Night Strike	1.99	Mini Office	4.95	Exploding Fiat	7.50	Elite	10.95
Video Pinball	1.99	DR. SOFT		Dodgy Gueuze	8.95	Crisdell	7.50
Olympic Spectacular	1.99	Phantom Combat	7.50	Terramotinos	6.50	Death Star	2.99
A.S.L.		ELITE		MIRRORSOFT		Overdrive	2.99
Onaga Orb	6.75	Paper Boy	7.75	Strike Force Hammer	7.50	Tempest	2.99
Graham Gooch	7.75	FIREBIRD		1st Steps with Mr Man	6.95	Fruit Machine	2.99
Thunderstruck	6.75	Bird Strike	1.99	Magic Study Master	7.50	Invaders	2.99
Thunderstruck 2	6.75	Star Driver	1.99	Here and There with Mr Man	6.50	Percy Panguin	2.99
Sphere of Deebny	6.75	GILSOFT		Word Games with Mr Man	7.50	Mr Wiz	2.99
Power Pack	7.75	The Quail	13.95	Giddy Game Show	7.50	Smash 'n' Grab	2.99
Power Pack 2	7.75	GREMLIN		ROBICO		TYNESOFT	
ATLANTIS		Footballer of the Year	7.75	Rick Hanson	7.95	Spy vs. Spy	7.75
Survivors	2.95	IMAGINE		Project Thesis	7.95	Overbridge	6.75
Perik	1.99	Yie Ar Kung Fu 2	7.20	Myosern	7.95	Phantom	6.75
BEAU-JOLLY		INCENTIVE		Rick Hanson Trilogy	18.95	The Big KO	6.75
10 Computer Hits 3	7.75	Adventure Creator	12.95	Village of Lost Souls	7.95	Future Shock	6.75
5 Star Games	7.75	Kat Trilogy	7.75	SUPERIOR		Gold	6.75
5 Star Games 2	7.75	Confuzion	4.95	Palace of Magic	7.75	Jet Set Willy 2	6.75
BUG-BYTE		LOGOTRON		Palace of Magic (+3 disc)	12.95	Commonwealth Games	6.75
Dunjunz	2.95	Xor	7.75	Crazee Rider	7.75	Mouse Trap	6.75
Plan B	2.95			Crazee Rider (+3 disc)	12.95	Winnar Olympics	6.50
Spaceknight	2.95			Strykies Run	7.75	Micro Value (4 games)	3.95
Templeton	2.95			Codename Droid	7.75	Micro Value Gold	3.95
				Codename Droid (+3 disc)	12.95	US GOLD	
				Around World 40 Screens	5.95	Impossible Mission	7.20
						Beach Head	6.95
						Crystal Castles	7.75

Orders normally despatched by First Class Post on day of receipt. But allow max. of seven days. All prices include VAT & P&P (Overseas orders add £1)

Name	Title	Cost
Address		
Make of Computer		Total

Access orders accepted
Make PO/Cheques payable to:
C & F ASSOCIATES
and send to:
C & F ASSOCIATES
CRANFORD HOUSE, WOOLLSLEY,
BIDEFORD, N. DEVON EX39 5QW.
Tel: (023 73) 619

Now combined in
two fun-filled
packages... all
the traditional
card and board
games you've
been asking for
- again and again!



9 Classic card &
board games

No. 1



For the BBC Micro and Electron

9 Classic card &
board games

No. 2



For the BBC Micro and Electron

Electron
cassette
£5.95 each

3½" disc
£7.95 each

Electron
cassette
can also
be used on
the BBC Micro

TO ORDER, PLEASE USE THE FORM ON PAGE 53

BBC/ELECTRON 'IMAGE' V.2

'IMAGE' was the ultimate tape back up system
now, it's even better

You can be completely assured that this is the best and most able program of its type available. It can deal with:

- Locked programs
- Programs of any length
- 300T and 1200 BAUD
- Files
- 7+ (C2) codes in Filename
- Multiple back ups
- False or trick back info.
- Changing Filename
- Continuous data stream
- Locking and unlocking programs

It is VERY IMPORTANT INDEED purchases take note that 'IMAGE' is for sale strictly for making BACK-UPS of your own software for your own use, for protecting your own programs, or as an aid to putting software on disk. Any person found using the program for illegal purposes runs the risk of being prosecuted.

To receive your copy of 'image', send a cheque or P.O. for the sum of
An Astonishing £5.80 to:

**Peter Donn, Dept. EU, 18 Tyrone Road,
Thorpe Bay, Essex SS1 3HF**

Please state BBC or Electron version. V.1 owners can obtain V.2 by sending £1.50 + V.1
AA269 without case BBC version only

USER PORT

EPROM PROGRAMMER

The USER PORT has BBC standard connector + ROM socket for 8 & 16K ROM software.

EPROM PROGRAMMER programs all standard
8, 16 & 32K EPROMs, plus CMOS devices.

User Port	£29.95
EPROM Programmer (Rom, 5.25 or 3.5 disk)	£34.95
'Mouse Art' Software (cassette)	£9.99
'Mouse Art' Software (Rom)	£14.50
Radio Teletext Software (cass)	£5.00

For further details on the above, send S.A.E.
COMING SOON: 4 CHANNEL SOUND CARTRIDGE

PROJECT EXPANSIONS

5 Teal Close, Fareham, Hampshire, PO16 8HG. Tel: 0325 221109

ADVERTISERS' INDEX

21st Software	20	Peter Donn	62
Advanced Computer Products	446	Project Expansions	62
Budgetsoft	56	Qual-Soft	10
C&F Associates	60	Slogger	40,41
Electron & BBC Micro User Show	13	Software Bargains	7
Jafa Systems	62	Superior Software	2,14,32,63,64
Lightspeed Software	62	Towerhill	54
Mithras Software	62	Voltmace	22

At last! MODE 7 on the ELECTRON

- Full hardware implementation
- 7 colours, flashing, double height, etc.
- 1k screen (HIMEM at &7C00)
- same video chips as BBC micro
- screen POKES displayed correctly
- connects between Electron and Plus One/ROMbox
- NO internal modifications to Electron
- RUNS BBC MODE 7 SOFTWARE, eg. WORDWISE

Jafa Systems
9 Lon-y-Garwa, Coerphilly,
Mid-Glamorgan
For further details, phone
0222 567203

Also still available - the original kit
boards for the ESP Second Processor
- bare pcb, instructions, and software
£15

• Price \$89 including p&p, etc.



LIGHTSPEED SOFTWARE

Dept EU
60 HIGH STREET HANHAM BRISTOL BS15 3DR
TEL: (0272) 60430

24 HOUR ANSWER PHONE FOR ALL QUERIES

New titles available on release day

TITLE	OUR PRICE	TITLE	OUR PRICE
ACORN'SOFT HITS 1	7.75	KIT TOLOGY	7.75
ACORN'SOFT HITS 2	7.75	LAST OF THE FREE	6.75
ADVENTURE CREATOR	12.50	MICROPOWER MAGIC II	6.75
BIG K.O.	6.90	MINI OFFICE	4.90
CODE NAME DROID	7.75	MOUSETRAP	6.75
CODE NAME DROID (3.5 disc)	12.50	OXBRIDGE	6.75
COLOSSUS CHESS 4.0	7.75	PAPERBOY	6.75
COMMONWEALTH GAMES	6.75	PHANTOM	6.90
COMPUTER HIT 10 V.1	7.75	PHANTOM COMBAT	7.75
COMPUTER HIT 10 V.2	7.75	POWER PACK	7.75
COMPUTER HIT 10 V.3	7.75	PSYCASTRAL	6.90
COMPUTER HIT 5	5.90	RAVENWALK	7.75
CRAZIE RIDER	7.75	REPTON 3	7.75
CRYSTAL CASTLES	7.75	ROUND WORLD 80 SCRIN	6.75
DODGY GEEZERS	7.50	SPHERE OF DESTINY	6.75
ELITE	10.50	STEVE DAVIS SNOOKER	7.25
EXPLODING RST	7.75	STRIKE FORCE HARRIER	7.75
FIVE STAR GAMES 1	7.75	SUPERIOR COL V.3 DISC	12.50
FOOTBALLER OF YEAR	7.75	SUPERIOR COL VOL 3	7.75
FRENCH ON THE RUN	7.75	TARZAN	7.75
FUTURESOCK	6.75	THE GULL	14.00
GOAL	6.75	THUNDERSTRUCK	6.75
GRAHAM GOOCH	7.75	THUNDERSTRUCK II	6.75
IAN BOTHER	7.75	WINTER OLYMPICS	6.75
IMPOSSIBLE MISSION	7.50	XOR	7.75
KAYLETH	6.90	YIE AR KUNG FU	7.00
		YIE AR KUNG FU II	7.50

ALL PRICES ARE INCLUSIVE OF VAT AND DELIVERY
INSIDE THE U.K.

PLEASE MAKE CHEQUES P.O.s PAYABLE TO

"LIGHTSPEED SOFTWARE"

ALL ORDERS DESPATCHED WITHIN 24 HOURS, BUT PLEASE
ALLOW 7 DAYS

MITHRAS SOFTWARE

Best selling software for your Electron at Bargain prices
New titles available from day of release

	RPP	Qms	RPP	Qms	
Crazie Rider	9.95	7.50	Scott Adams Scope (4 disk)	9.95	7.50
Crazie Rider Disk	14.95	12.50	The Lost Crystal	12.95	10.65
CodeName: Droid	9.95	7.50	Outbridge	7.95	6.50
CodeName: Droid Disc	14.95	12.50	Kat Trilogy	9.95	7.50
Shyler's Run	8.95	7.50	Dodgy Geezers	8.95	6.95
Graham Gooch Test Cricket	9.95	7.50	KeyKeh	7.99	6.50
Spy V Spy	9.95	7.50	The Adventure Creator	14.95	12.95
Omega Op	7.95	6.50	The Gull	16.95	12.95
XOR	7.50	6.50	Rick Hanson Trilogy	23.95	18.95
Around World 40 Screens	8.95	6.95	Rick Hanson	9.95	7.95
Sphere of Destiny	7.95	6.50	Project Thekiss	9.95	7.95
Superior Collection Vol 3	9.95	7.50	Myron	9.95	7.95
Superior Collection Disc	14.95	12.50	Wheel of Fortune	7.95	6.50
Acornsoft Hits Vol 1	8.95	7.50	Claude Frankoline	5.95	5.25
Acornsoft Hits Vol 2	9.95	7.50	Quest for Holy Grail	5.95	5.25
Paper Boy	9.95	7.50	Kingdom of Klax	5.95	5.25
Elke	12.95	10.95	Magnetic Moon	4.50	4.50
Yie Ar Kung Fu 2	8.95	8.95	Ring of Salandra	4.50	4.50
10 Computer Hits 3	9.95	7.50	The Nine Decades	9.95	9.95
5 Computer Hits	6.95	5.95	Wyndwood	3.95	3.95
Five Star Games Vol 2	9.95	7.50	The Puppet Man	3.95	3.95
Colossus Chess	9.95	7.75	Solen Lamp	2.75	2.75
Impossible Mission	8.95	6.95	Adventures	2.75	2.75
Revenant	7.50	6.95	Arms of Death	2.75	2.75
Phantom Combat	7.95	6.90	Cinco	2.75	2.75
Tarzan	9.95	7.50	Escape from Planet 7	2.75	2.75
Thunderstruck 2	7.95	6.50	Golden Bell	2.75	2.75
Picture Shock	7.95	6.50	Panacea and Andromeda	2.75	2.75
The Big K.O.	7.95	6.50	The Time Machine	2.75	2.75
Goal	7.95	6.50	Ten Little Indians	2.75	2.75
Footballer of the Year	9.95	7.50	Wawoo	2.75	2.75
Micropower Magic 2	7.95	6.50	Wizard Allys	2.75	2.75
Plan B	2.95	2.95	Stranded	2.75	2.75
Danjaz	2.95	2.95	Fort	2.75	2.75
Unlana	2.95	2.95	Uap	2.75	2.75
Hunkydory	2.95	2.95	U.X.P.M	2.75	2.75
Survivors	2.95	2.95	Football Manager	2.95	2.95
Super	2.75	2.75	Micro Value (4 Games)	3.95	3.95

ALL PRICES INCLUDE P&P IN UK AND DESPATCH WITHIN 7 DAYS OF RECEIPT OF
ORDER BY FIRST CLASS POST.

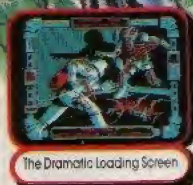
(Orders to Europe and Eire add 50p for each item. Worldwide add £1 for 1st and 50p for each other item. Please
send cheque payable through a UK bank or arrange for payment by Postal Girocheque). Please Quote Electron
(A BBC kit is available on request) and send cheque or PO payable to:

MITHRAS SOFTWARE

PO Box 151, Maulden, Bedford, MK45 2YH
Tel: (0525) 402630

CODENAME: DROID

Stryker's Run - Part 2



The Dramatic Loading Screen



Climbing up a rope
(SURFACE DEFENCE)



Flying with a jet pack
(ANCIENT SHRINE)



The elusive 'Herbert' Droid
(CREW'S QUARTERS)



Crawling under a crane
(MISSILE FACTORY)

Commander John Stryker is back in CODENAME: DROID

Stryker's Run was one of our most successful releases of 1986. It stayed at the top of the BBC Micro software charts for six weeks and received several glowing reviews: "The graphics are stunning... This should be in every collection" enthused A & B Computing.

Now CODENAME: DROID presents a new challenge for Commander John Stryker. He has been commissioned by the Allied Nations to undertake another perilous mission in their continuing struggle against the warmongering Volgans.

His task is to locate and seize the Volgans' latest weapon: a new spacecraft (codenamed the Z1) which is equipped with the revolutionary matter/anti-matter warp drive facility. Stryker must land on the mysterious planet Volga, penetrate the Volgans' underground defence systems, find the spacecraft and requisition it.

As Stryker descends below the planetary surface, he will pass through 4 different zones of Volgan activity:

- The Surface Defence — an array of steel girders, ropes and chains lies coldly between the crusted white rock walls.
- The Ancient Shrine — a stone-walled temple bedecked with hideous gargoyles and rusting chandeliers.
- The Crew's Quarters — the Volgans' relaxation area: tables and chairs are arranged invitingly amongst the essential ventilation pipes.
- The Missile Factory — clinical pseudo-metallic walls surround the missiles, bombs, and computers of the evil Volgan race.

Your character in the game can jump, run, kneel, crawl, climb up and down ropes, fire his laser blaster and drop mines. He can also fly for short distances using his jet-pack, and access information via his wrist terminal computer.

HELLO



BBC Micro Cassette..... **£9.95** Acorn Electron Cassette... **£9.95**
BBC Micro 5 1/4" Disc..... **£11.95** Acorn Electron 3 1/2" Disc. **£14.95**
BBC Master Compact 3 1/2" Disc..... **£14.95**

The screen pictures show the BBC Micro version of the game.
The graphics of the Acorn Electron version are identical.

Prize Competition

If you complete the entire CODENAME: DROID mission, you can enter our competition.

Prizes include 1 talking remote-controlled robot, 5 small remote-controlled robots, £150 in cash, and competition certificates.
Closing Date: 29th February, 1988.

Please make
all cheques
payable to
"Superior
Software Ltd".



24 HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

- OUR GUARANTEE**
- All mail orders are despatched within 24 hours by first-class post.
 - Postage and packing is free.
 - Faulty cassettes and discs will be replaced immediately.

SUPERIOR SOFTWARE
Limited

ACORN SOFT

PALACE of MAGIC



Leaping over deadly swords and spikes



Climbing up the East tower



Wandering through a patch of woodland



Approaching the meandering river



At the top of the West tower



Exploring the passages



Greeting the Guardian of the Guards



Down in the dungeons



Over 100 Screens full of Challenging Puzzles and Awesome Foes

By practising acts of benevolence and goodwill, you have offended the evil wizard Caldeil. Summoning forth his satanic powers in order to extract retribution, he has cast two powerful spells upon you: (1) you have been reduced to the size of a dwarf; (2) Caldeil has banished you to one of his old homes, the "Palace of Magic".

The palace and its surrounding land is littered with magical objects and mysterious creatures. It is rumoured that there is also a hidden transporter — your only means of escape from this enchanted place.

After exploring the rooms of the palace, you should venture forth through the enclosing woodland: towards the ancient church and the eerie dungeons, or through the maze of secret passages, or over the river to the princess's house.

On your journeys, you will encounter many strange animals and people including rock monsters, gremlins, imps and guards. Some are good and some are evil. You will need to decide who you can trust to help you in this arduous quest.

BBC Micro Cassette.....	£9.95	Acorn Electron Cassette.....	£9.95
BBC Micro 5¼" Disc.....	£11.95	Acorn Electron 5¼" Disc.....	£11.95
BBC Master Compact 3½" Disc.....	£14.95	Acorn Electron 3½" Disc.....	£14.95

(Compatible with the BBC B, B+ and Master Series computers).

PRIZE COMPETITION

The first prize in our competition is a treasure chest containing over £200 worth of mystical and magical artefacts. 10 runners-up will each receive £5 and a signed certificate. To enter the competition, you must complete the "Palace of Magic" adventure, and note down the congratulatory message you receive. Closing Date: 30th April, 1988.



Dept. PM3, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453

Please make all cheques payable to "Superior Software Ltd".



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately. (This does not affect your statutory rights).